



2021 Sustainability Progress Report

Building a better tomorrow AUGUST 2022



Sustainability

Sustainability at Sound Transit

Sustainability is at the core of our mission: connecting more people to more places to make life better and create equitable opportunities for all. Investing in transit builds a better future by supporting a clean environment, connecting communities and fostering vibrant economies. Despite the challenges of operating during a pandemic, Sound Transit supported regional sustainability by continuing to serve the riders who depend on transit the most.

Sustainability helps implement our mission by:

- Providing affordable, safe regional transportation options.
- Promoting stewardship that conserves the planet's natural environment.
- Supporting community prosperity by helping residents and businesses save time and money.



Sound Transit uses a robust Environment and Sustainability Management System to guide our environmental and sustainability initiatives. The system holds the agency accountable for controlling potential environmental impacts, achieving annual environmental and sustainability targets, and demonstrating continual improvement in performance.

Since 2007, Sound Transit's ESMS has maintained international ISO 14001 certification for accountability in controlling environmental impacts, maintaining environmental compliance and demonstrating enhanced sustainability performance.

Sustainable Business Practices and strategies will be integrated throughout the Sound Transit organization, including planning, designing, constructing, operating existing and new transit systems and facilities. Executive Order No. 1, 2007

About this report

This year's Annual Progress Report summarizes our efforts to achieve long- and short-term environmental and sustainability goals, and it highlights the ongoing challenges of providing service while continuing to recover from a pandemic.

Analysis and performance measures in this report focus on how Sound Transit uses its resources—including through capital project planning and design—and how we operate our services. (This report does not include resource use from the agency's construction activities.)

The pandemic continues to dramatically alter travel patterns throughout the region, as clearly reflected in annual ridership and resource use data. While 2020 data illustrated an abrupt break from the agency's improving efficiency and sustainability performance over the past five plus years, 2021 data begins to show the story of the agency's ongoing recovery from the pandemic.

The data in this report focuses on the metrics set by Sound Transit's Sustainability Plan, which established short-term goals for the years 2019 through 2024 and extended the agency's long-term goals to 2050. The year 2018 serves as the baseline for the agency's short-term goals and key performance indicators.

These metrics reflect multiple reporting frameworks and standards, including those used by other transit agencies and local governments, as well as the American Public Transportation Association's Sustainability Commitment and The Climate Registry. Sound Transit's 2019 and 2020 greenhouse gas inventories have received third party verification to be compliant with The Climate Registry General Reporting Protocol.





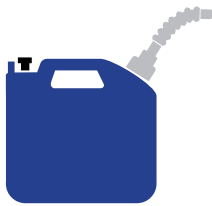
Transit is sustainable

Sound Transit's system expansion is essential to Central Puget Sound's sustainable future. We promote sustainability by developing and operating regional transit and fostering smart growth. The agency's focus on rebounding ridership to pre-pandemic levels is also an integral component of our sustainability goals.

System expansion will help more people travel affordably and reliably on environmentally friendly buses and trains throughout the region's growing communities. Expanding mass transit services benefits everyone by offering a less carbon-intensive means of travel, which decreases air and water pollution. Plus, transit also:



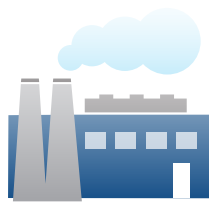
SAVES TIME



SAVES FUEL



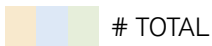
SAVES MONEY

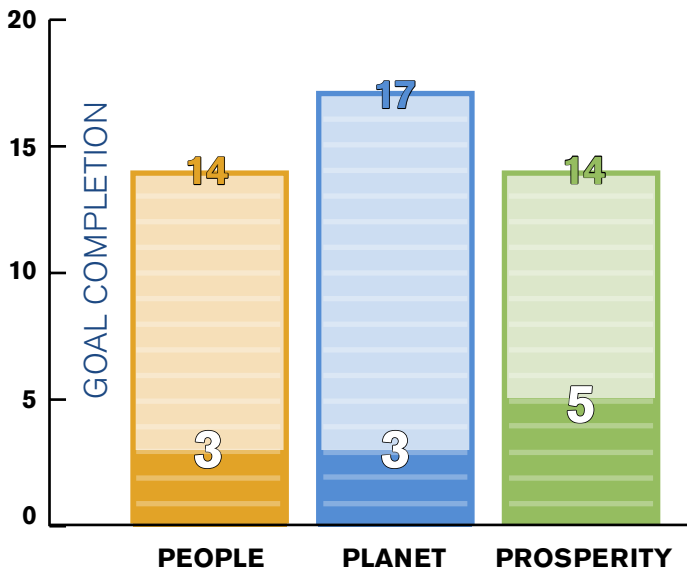


**IMPROVES
AIR QUALITY**

Progress toward the Sustainability Plan

This report includes both data on Sound Transit's operational performance from a resource use perspective, as well as progress on short-term goals in the Sustainability Plan. As of 2021, Sound Transit has completed eleven of the Plan's 45 short-term goals, and we're on track to complete the majority by 2024.

 # TOTAL  # COMPLETED



Key accomplishments

We achieved a number of important sustainability accomplishments over the last year that leverage social, environmental and financial benefits for the region's future. In 2021, Sound Transit:

- Continued to recover ridership levels as three new Link light rail stations opened and COVID-19 pandemic restrictions lifted. Ridership rebounded 12% in 2021.
- Diverted nearly 122,000 tons of greenhouse gas emissions—nearly 2.5 times the emissions produced—despite continued low ridership due to the pandemic.
- Planned for the agency's first battery electric bus service on the SR 522 bus rapid transit corridor.
- Joined the Federal Transit Administration's Healthy Planet Challenge.
- Launched the fare ambassador pilot program to ensure equitable fare enforcement.
- Saved more than \$700K from 35 new and existing sustainability and resource efficiency projects.

Continual improvement

Sound Transit is committed to improving sustainability performance year after year. In the next year, we'll focus our sustainability efforts on:

- Continuing fleet decarbonization efforts by drafting an FTA-compliant Zero Emission Fleet Transition Plan for all Sound Transit bus services.
- Updating sustainable design requirements for system expansion projects with a focus on carbon reduction and resource conservation.
- Continuing to support the implementation of the Racial Equity Toolkit.
- Determining how to prioritize sustainability in complex decision-making processes.
- Preparing to participate in the Washington State Clean Fuel Standard, which is expected to generate agency revenue from operating carbon-free transportation.

People

Helping people move freely, affordably and healthily by providing regional transit service

Recovering ridership



Sound Transit remains committed to providing affordable, reliable service to ensure residents can access the places they live, work and play. In 2021, ridership reflected pandemic recovery trends by closely mirroring the rise and fall of COVID-19 variants. More people took transit month over month, with ridership across all services increasing more than 200% between January and October's opening of the Northgate Link light rail extension. The 4.3-mile extension added three new stations to the system, at Northgate, Roosevelt and U District, and further enabled access to community resources such as North Seattle Community College, the Kraken Community Iceplex and many other businesses and medical facilities. With the rise of the COVID-19 Omicron variant at the end of the year, ridership dipped but still remained more than twice as high as the beginning of the year.

More people took transit month over month, with ridership across all services increasing more than 200% between January and October's opening of the Northgate Link light rail extension.



4 - Sound Transit 2021 Sustainability Progress Report

Key Performance Indicators

Dollars contributed to affordable housing revolving loan fund:
\$4 million

Staff trained in equity and inclusion:
88% of staff completed Equal Employment Opportunity Training.
59% of staff completed Implicit Bias Training.
20% of staff completed Inclusion Training.
10% of staff attended Organizational Equity Workshop.

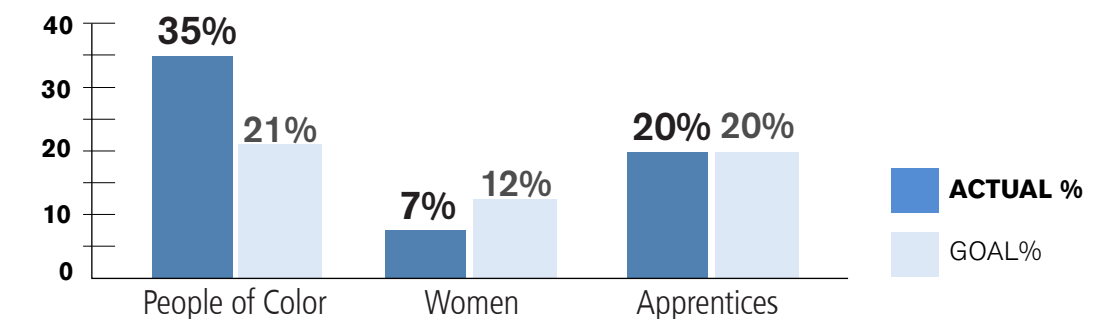
Hours worked on ST job sites:
35% by people of color; 7% by women; 20% by apprentices.

Staff trained to sustainable professional accreditations:
49 Envision Sustainability Professionals.
18 LEED Accredited Professionals.
12 other sustainability certifications.

Employing Puget Sound residents

Sound Transit's system expansion projects bring construction employment opportunities to communities across the Puget Sound region and we work to promote opportunities for apprentices, women and people of color in the construction industry.

In 2021, Sound Transit's construction projects directly employed more than 9,861 people working 4.3 million hours and earning \$214 million in wages.



People

Helping people move freely, affordably and healthily by providing regional transit service

LONG-TERM GOALS:

Social equity addressed and implemented as an agency value

Accelerating affordable housing

Sound Transit is committed to supporting affordable housing development. In 2021, Amazon and Sound Transit announced a partnership to accelerate the creation of up to 1,200 new affordable housing units on our surplus properties near light rail stations across the region. Amazon committed \$100 million in funding to spur developers to expedite these critical projects.



“Housing and transit are intertwined, and this latest commitment will help ensure families from all income levels will benefit from the build out of mass transit—greater affordability and equitable economic opportunity, easy access to daily needs, and the environmental benefits of reduced traffic congestion and car reliance.”

Catherine Bell, Head of Community Development at Amazon.

All staff champion sustainability

Enhancing the Passenger Experience

Sound Transit's Passenger Experience program worked across the agency to develop Station Experience Design Guidelines for Link light rail stations and the surrounding environment to better support transit passengers. The new agency design guidance streamlines requirements for enhancing the passenger experience by providing consistent, efficient and supportive designs for stations, station access, integration with surrounding neighborhoods and equitable transit-oriented development.



Equitably collecting fares

Furthering the agency's commitment to equitable fare collection processes, Sound Transit launched the Fare Ambassador Pilot Program in 2021. The initiative replaces fare enforcement officers with Fare Ambassadors. Fare Ambassadors wear bright yellow caps and carry yellow messenger bags to be easily recognizable, and they focus on passenger education and customer service rather than enforcement.

The program also expands access to ORCA LIFT fares for low-income riders and partners with King County Metro to provide subsidized annual passes to qualified riders. “Fare revenues are critical for operating a fast-expanding regional transit system that increases mobility and opportunities across the region, especially for populations that depend most on transit,” said former Sound Transit CEO Peter Rogoff. “It is critical that we foster a welcoming environment for every rider and ensure that transit is accessible and affordable for all.”

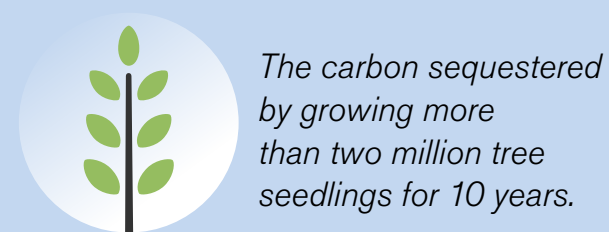
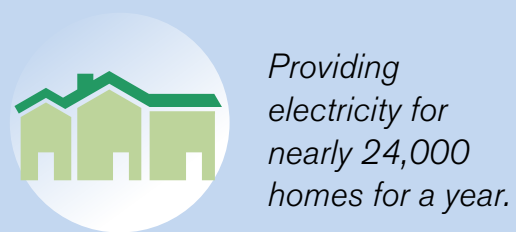
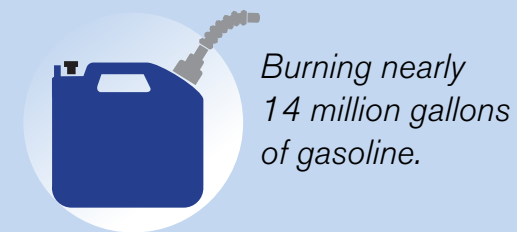
Planet

Promoting stewardship to conserve the planet's natural environment

Increasing environmental benefits

Sound Transit and our partner services provide tangible environmental benefits for the region's growing communities. When residents choose transit instead of driving alone, they reduce air and water pollution, among other benefits.

Passengers taking Sound Transit avoided nearly 122,000 tons of greenhouse gas emissions annually. This represents a 3% increase in avoided emissions since 2020, illustrating a gradual ridership rebound as the region recovers from the COVID-19 pandemic. In 2021, Sound Transit avoided nearly 2.5 times the amount of emissions the agency produced, compared to nearly six times the emissions produced in 2019, prior to the pandemic. The avoided emissions are equivalent emissions to:



Key Performance Indicators

Greenhouse gas emissions

27% reduction

Criteria air pollutants

Particulate Matter: 16% decrease / Volatile Organic Compounds: 3% increase

NOx: 2% decrease / CO: 0% decrease / Sox: 13% decrease

kWh renewable energy production

153,511 kWh produced in 2021

Energy used in facilities built before 2018

0% reduction

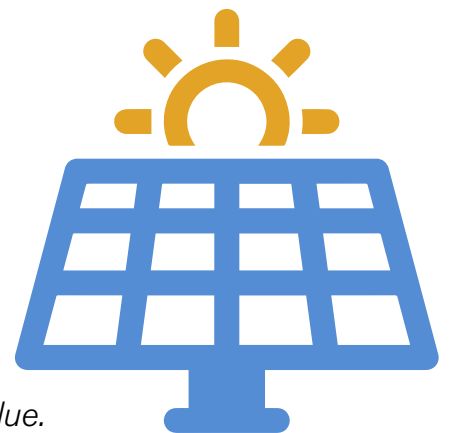
Number of fineable environmental compliance violations

0 violations in 2021

Agency water use

45% increase

Key performance indicators' percent changes are total (not normalized). Percent changes are based on a 2018 baseline value.



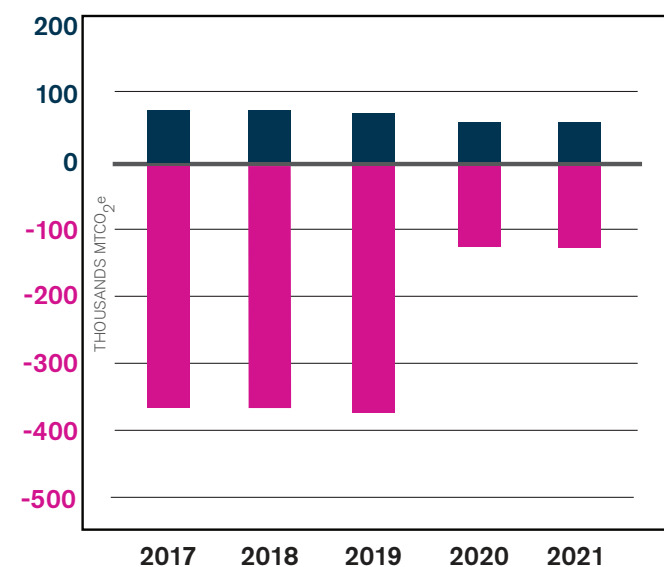
93%

of Sound Transit's electricity comes from carbon free sources

Greenhouse gas emissions

Every year the benefits of Sound Transit's service far exceeds the emissions associated with operating that service.

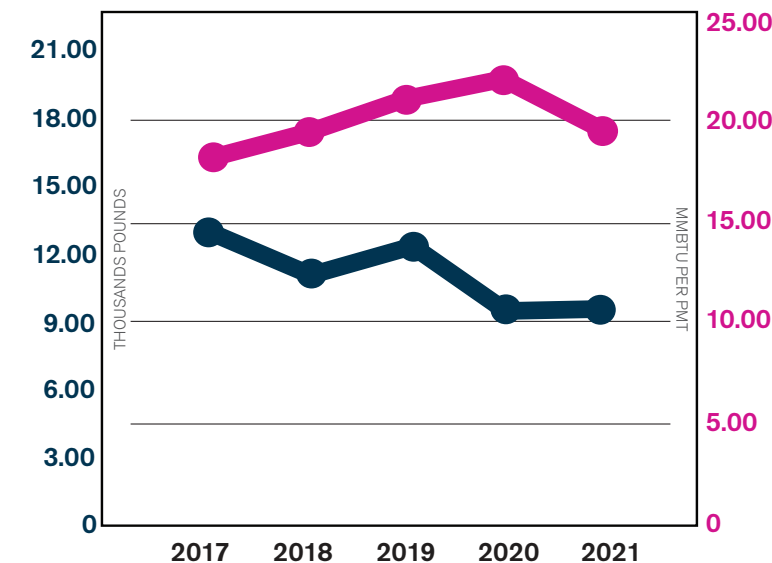
■ Agency emissions from operations
■ Regional emissions avoided when residents take transit



Reducing air pollution

Updates to Sounder engines and phasing out older ST Express diesel buses have reduced Sound Transit's air pollution.

■ PM10
■ Carbon monoxide



Planet

Promoting stewardship to conserve the planet's natural environment

LONG-TERM GOALS:

Achieve carbon-free operations

Electrifying fleets and facilities

We've made significant strides toward our 2030 goal of carbon-free electricity use. Notable 2021 accomplishments included:

- Renovating Union Station to become a carbon-free facility. This includes plans for a new high-efficiency electric boiler to replace the natural gas boiler, powered by Seattle City Light's carbon free electricity.
- Installing non-revenue fleet electric vehicle charging units at the Northgate and Union Station garages. These charging stations will allow the non-revenue fleet to replace gas-powered vehicles with fully electric vehicles.
- Launching the second Green Direct agreement with Puget Sound Energy. This power purchase agreement, in combination with the 2020 agreement, allowed Sound Transit to achieve 93% carbon-free electricity by purchasing 100% renewable electricity from Puget Sound Energy.



Enhance ecosystem functions

Minimizing our critical habitat impacts

Sound Transit strives to avoid and minimize impacts to wetlands, streams and other critical habitat areas. If impacts are unavoidable, we mitigate in a number of ways, including creating new wetlands, relocating streams, and enhancing existing degraded habitats. These mitigation approaches are all implemented concurrent with the project impacts.

In 2021, Sound Transit staff evaluated the feasibility of using “advance mitigation” on future projects in the South Corridor, where options to compensate for unavoidable impacts to wetlands and streams are limited. Advance mitigation is planned, designed and constructed several years before a project's environmental impacts will begin. The benefits of advance mitigation include potential cost savings, decreased risk of mitigation site failure, and greater ecological benefits that align with watershed priorities.

Partnering for trees

In 2021, Sound Transit, the City of Shoreline and King Conservation District announced the Trees for Rail partnership to re-green the Lynnwood Link light rail corridor with native trees and shrubs. This first-of-its-kind partnership utilized the KCD's Urban Tree Canopy program to establish native vegetation and tree canopy to reduce the construction impact on adjacent homeowners. The City of Shoreline requires landscape buffers between the light rail corridor and residential neighborhoods, but in some locations there was not enough space on Sound Transit or city property for plantings. Shoreline, Sound Transit and KCD worked together to develop a plan to plant trees and shrubs at nearby homes. “This program builds on our existing commitment to plant thousands of trees along the Lynnwood Link alignment,” said former Sound Transit CEO Peter Rogoff. “We think teaming up with the City of Shoreline and bringing the expertise of KCD to homeowners in these areas will be a big win for residents and the environment.”



Prosperity

Support local economic prosperity by enabling residents and businesses to save time and money

Savings taxpayer dollars

Sound Transit invests in sustainability—and sustainability pays back. Over the past 10 years, we’ve invested in many projects that save natural resources and save the agency money. These projects include operational improvements like using electric wayside power units on Sounder trains to reduce the idling of diesel engines and upgrading inefficient lighting to LEDs. This sample of the agency’s resource conservation projects saved Sound Transit more than \$700,000 in 2021 alone, and nearly \$6.3 million over project lifetimes.

Savings:



	2021 Savings	Savings to date
Fleet upgrade projects	\$406,871	\$4,738,012
Irrigation projects	\$53,416	\$328,386
Facilities upgrade projects	\$28,397	\$207,608
Solar installations	\$13,931	\$36,563
LED lighting upgrade projects	\$200,510	\$961,799

More details on sustainability cost savings are located in Appendix B.

Key Performance Indicators

Staff trained in emergency preparedness

1,411 staff trained in COVID-19 Work Site Safety | 25 staff attended Safety Lunch and Learns
449 staff trained in Non-Revenue Vehicle Safe Driving | 17 staff certified in First Aid/CPR/AED

Projects that include Climate Change Vulnerability Assessments

100% of eligible projects

Waste diverted

33%

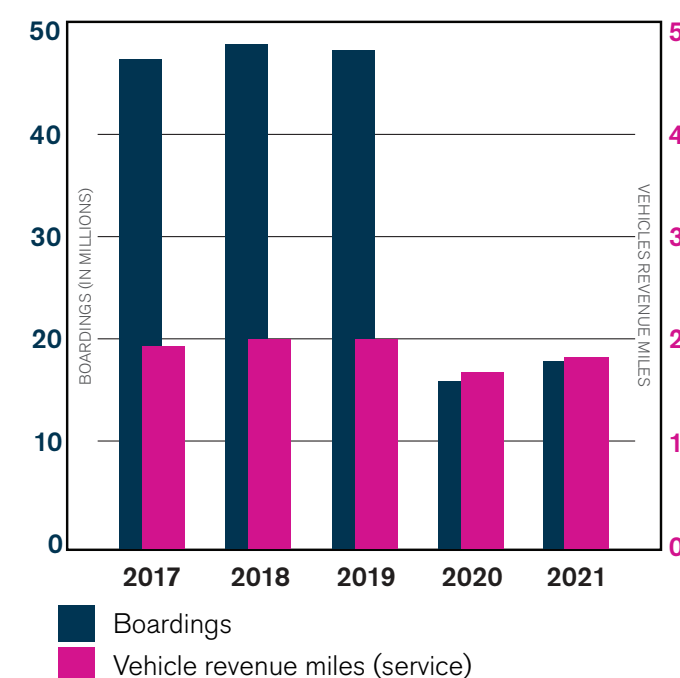
Percentage of and increase in dollar value of new procurements that include green methods and features

44% of procurements included green methods | 42% decrease in dollar value from 2018, 204% increase in dollar value from 2020

Key performance indicators' percent changes are total (not normalized)

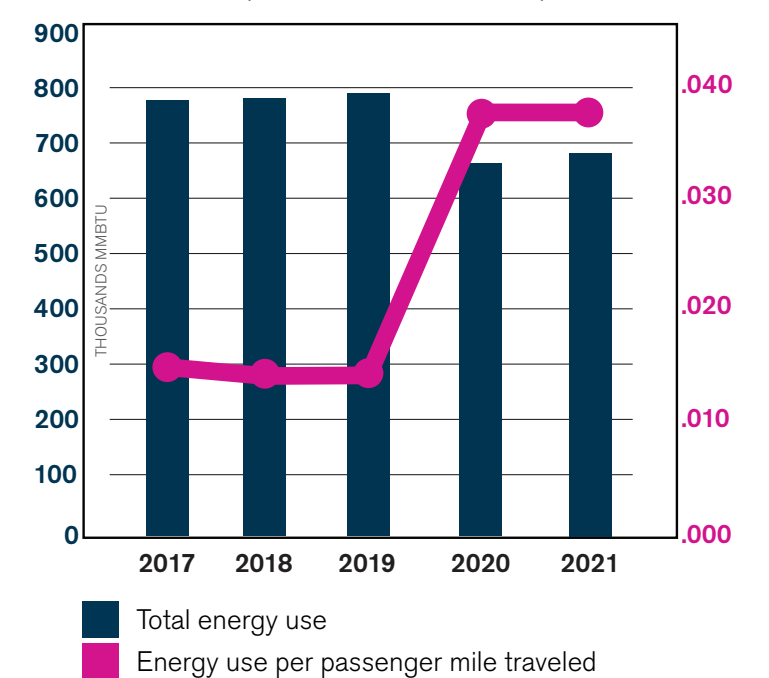
Boardings and service

Sound Transit carried more passengers per service levels every year, until the disruption of the COVID-19 pandemic



Revenue fleet energy use

All services continued to operate efficiently by carrying passengers further while using fuel more efficiently, until the disruption of the COVID-19 pandemic.



Prosperity

Support local economic prosperity by enabling residents and businesses to save time and money

LONG-TERM GOAL:

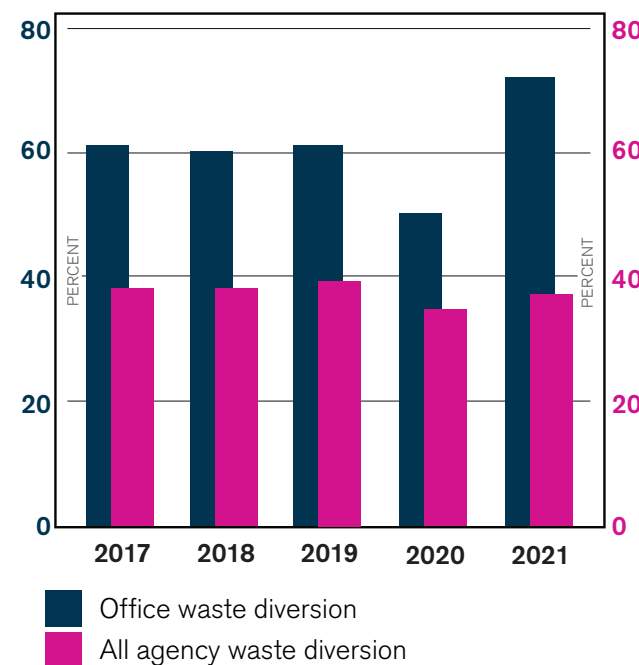
Build resilience to climate change and natural or manmade disasters

Evaluating climate change impacts

In 2021, the agency drafted Climate Vulnerability Guidelines to create a uniform process for evaluating the climate vulnerability of proposed Link light rail capital projects. The guidelines provide standardized guidance for Sound Transit and consultant staff to assess how and where current and future climate change impacts may impact the functioning and longevity of project infrastructure and service delivery. The guidance focuses on heat, localized flooding and sea level rise and also includes scientific data from peer-reviewed literature on the scale of these expected impacts.

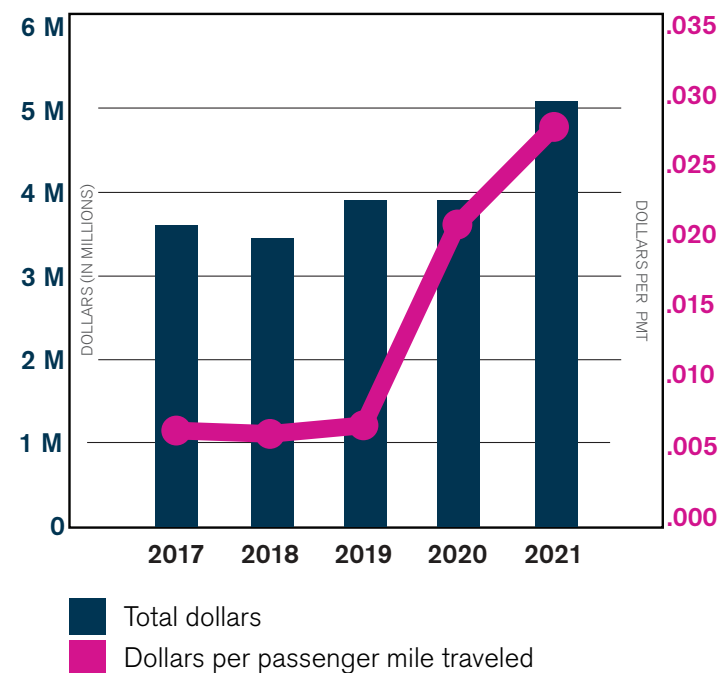
Waste diversion

Sound Transit continues to maintain a high waste diversion rate in our office buildings and is exploring ways to increase waste diversion from service operations.



Utility costs

Sound Transit is a growing agency, but has been able to keep costs per level of service relatively steady, until the disruption of the COVID-19 pandemic.



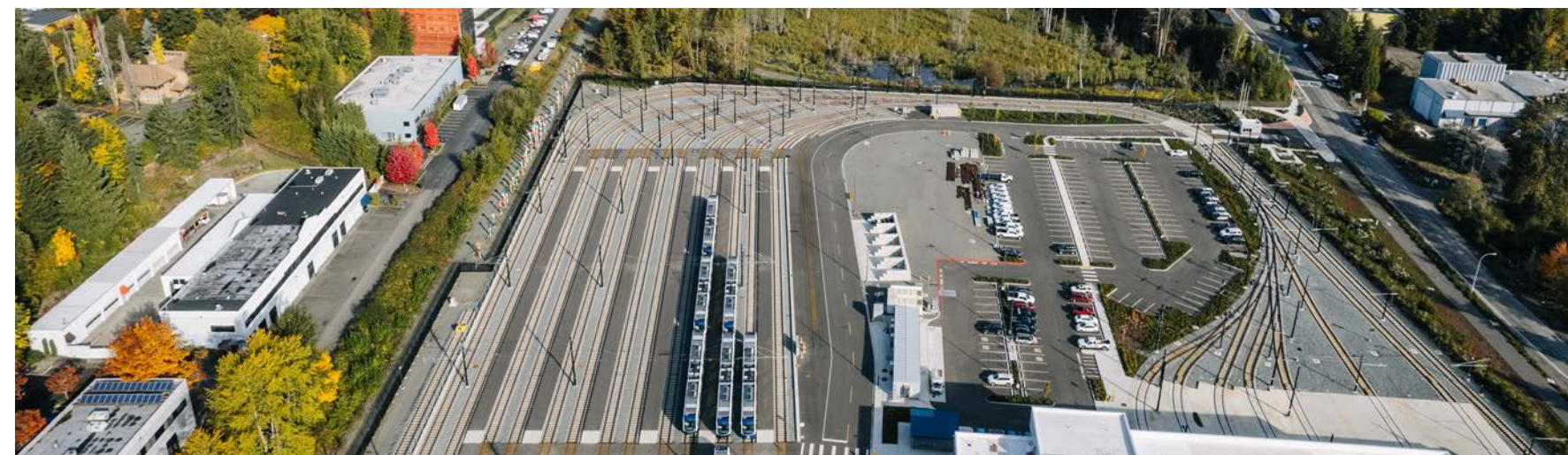
Maximize operational efficiency

Achieving LEED Gold

The Operations and Maintenance Facility East is the first facility of its kind at Sound Transit to receive LEED Gold for New Construction certification. Earning LEED Gold demonstrates our ongoing commitment to building sustainable and resource-efficient buildings that provide a healthy working environment, support environmental best practices, and save operating costs over the entire life of the facility.

The state-of-the-art facility will accommodate the service, maintenance, storage and deployment of 96 light rail vehicles. Key sustainability features include:

- Advanced energy meters and controls to ensure energy efficiency over time.
- A 100-kw rooftop solar array to offset energy use.
- Electric vehicle chargers for NRV fleet.
- More than 95% construction waste diversion from landfills.
- Irrigation water use reductions of 64% with drought tolerant plants and drip irrigation systems.
- Interior water reduction of more than 40% through use of water efficient fixtures.
- Energy efficient outdoor light fixtures that minimize neighborhood light pollution.
- Forest Stewardship Council-certified wood throughout the project.





2021 Sustainability Targets

Sound Transit Year in Review

People

- ☐ Evaluate alternatives for delivering parking investments in the Everett Link Extension corridor.*
- ☐ Evaluate affordable homeownership potential on at least one surplus property site.*
- ☐ Finalize revolving loan fund business plan.
- ☒ Refine sustainability guidelines and goals for transit-oriented development projects.
- ☒ Develop and initiate implementation of an agency anti-racist strategy.
- ☒ Create implementation plans for the Racial Equity Tool, Equitable Engagement Tool, and Equity and Inclusion Policy.
- ☒ Launch three training initiatives to address implicit bias, racial equity and anti-racism.
- ☒ Enhance the technical assistance program to better serve veteran and disability-owned businesses.
- ☐ Implement a methodology for applying equity criteria in alternatives and environmental evaluation processes for all capital projects.*
- ☒ Initiate new construction apprenticeship programs in Snohomish and Pierce Counties.
- ☐ Award and implement first round of System Access Funds.*
- ☒ Identify key Operations Facilities staff to pursue sustainability professional accreditations.
- ☒ Develop workplan to establish internal agency green team.
- ☒ Implement work plan to create standards for a hybrid workforce of office-based, job site and teleworking staff.
- ☐ Finalize Station Experience Design Manual to guide and standardize passenger experience.*
- ☒ Train all Passenger Experience staff on using personas to inform decision making and employ the passenger persona approach to project development and service planning.

** These partially completed targets are on track for finalization in 2022*

2021 Sustainability Targets

Sound Transit Year in Review

Planet

- ☐ Renovate Union Station to operate as a carbon-free facility.*
- ☒ Launch regional, interagency battery electric bus working group.
- ☒ Install non-revenue fleet electric vehicle charging at Northgate Station and Union Station garages.
- ☒ Revise contract specifications and project requirements for construction stormwater management, treatment and discharge.
- ☒ Reduce the carbon intensity of electricity by launching Phase 2 of PSE Green Direct Program.
- ☒ Evaluate carbon-free electricity purchasing options with utility partners.
- ☐ Document procedures for using the environmental commitment tracking and reporting system.*
- ☒ Launch Efficiency and Sustainability Program's internal grant opportunities.
- ☐ Update design criteria by determining applicability of embodied carbon in materials, electric vehicle and solar power readiness and zero carbon green building certifications.*
- ☐ Update Migratory Bird Treaty Act design specifications, project requirements and plans.*
- ☒ Require 85% of eligible construction equipment to meet EPA's highest standards.
- ☒ Evaluate the feasibility of an advanced mitigation approach for wetlands and streams using an ST3 project as a case study.
- ☒ Define customized options for performance-oriented sustainability goals on capital projects.

Prosperity

- ☒ Develop guidelines for conducting climate vulnerability assessments for capital projects.
- ☐ Integrate total cost of ownership and budget information into 90% of new IT and non-expansion project intake processes.*
- ☒ Conduct gap assessment of agency capabilities against international standards for safety and asset management.
- ☒ Align reporting between agency's Sustainability and Strategic Plans.
- ☒ Improve waste collection stormwater protection at Operations and Maintenance Facility Central.
- ☒ Initiate streamlining of IT onboarding process through the launch of the Workforce Enablement Program.
- ☒ Develop and require the use of standard sustainability language for Operations and Maintenance agreements.
- ☒ Include sustainability evaluation criteria in at least 75% of informal Request for Quotes with Qualifications (less than \$250,000)

* These partially completed targets are on track for finalization in 2022.



2022 Environmental and Sustainability Targets

Supporting people, planet and prosperity

People

- Create potential delivery approaches for joint-development projects integrated with new park and-ride facilities.
- Support the opening of more than 600 affordable rental housing units.
- Finalize sustainability guidelines for transit-oriented development projects.
- Begin anti-racist strategy work plan implementation.
- Launch the Racial Equity Toolkit and Equitable Engagement Tool implementation plan.
- Host five anti-racism workshop cohorts for ST employees.
- Enhance training and technical opportunities to prepare DBEs to lead ST contracts.
- Define options for implementing flexible access improvements for delayed parking facilities.
- Expand the permit parking program's authority to include daily permits.
- Establish agencywide sustainability networking and educational forum for all staff.
- Identify key DECM and PSO staff to pursue sustainability professional accreditations.
- Refine hybrid workforce standards and conduct trainings on hybrid best practices.
- Launch self-service resources for IT service desk.
- Support retirement readiness program.
- Launch Passenger Information Management System.
- Set up job-description platform with revised ADA requirements.

** These partially completed targets are on track for finalization in 2022*

2022 Environmental and Sustainability Targets

Supporting people, planet and prosperity

Planet

- Propose carbon-free operational design standards for new facilities.
- Draft a roadmap for achieving carbon-free operations for facilities and fleets by 2050.
- Develop zero-emissions implementation plan for agency bus fleets.
- Evaluate the potential to use renewable diesel fuel in agency bus fleets.
- Increase green building standard to LEED Gold for new facilities.
- Set low-carbon concrete requirements for three new facilities.
- Refine the cataloguing of ecosystem services to be evaluated for ST mitigation sites.
- Survey SBE/DBE contractors' equipment inventory to determine air quality emissions.
- Evaluate two new green building standards.
- Clarify and document Tribal engagement protocols for capital projects.

Prosperity

- Initiate Snohomish County Threat Hazard Identification Risk Analysis.
- Revamp staff emergency preparedness plans for hybrid workforce.
- Standardize climate vulnerability assessment implementation for capital projects.
- Incorporate sustainability into non-system expansion projects by including screening criteria in the Portfolio Review Board and department-level pre-screening processes, as appropriate.
- Update and approve Asset Management policy.
- Prioritize and address high-risk items for safety management system ISO certification.
- Implement centralized hazard database to streamline safety and security hazard management.
- Draft operating plans to support LEED EBOM certification at Union Station.
- Expand the Green Procurement program to include all staff.
- Embed sustainability into the evaluation criteria for all Architecture and Engineering and Qualifications-Based Construction procurements.
- Develop and implement the Procurement & Contracts Division electronic contract library for all agency access.

** These partially completed targets are on track for finalization in 2022*



For more information contact esms@soundtransit.org
or visit soundtransit.org/get-to-know-us/who-we-are/environment-sustainability

August 2022

Appendix A – 2021 Sustainability Inventory

Executive Summary

This Appendix presents key data snapshots from Sound Transit's 2021 Annual Sustainability Progress Report and identifies resource use patterns compared to earlier years of performance. The report evaluates 2021 performance metrics, as well as performance data trends over multiple years.

In 2021, Sound Transit's operations were recovering from, but still deeply affected by, the COVID-19 pandemic. The report illustrates clearly that transit ridership has only just begun to rebound. While some workers gradually returned to the office, the prevalence of remote and hybrid workplaces appears to be a durable trend moving forward.

Please note that any statements about resource use trends and metrics in this appendix are made in absolute terms unless explicitly stated otherwise; normalized trend analyses and metrics will be explicitly labeled as such. (i.e. greenhouse gas emissions *per* passenger miles traveled).

The main takeaways from the year include:

- Total ridership modestly increased in 2021 from the 2020 pandemic lows.
- Resource use increased across the board, as a result of increasing service levels and the opening of the Northgate Link Extension. Resource use increases were both absolute and normalized, as ridership levels have not returned to pre-pandemic levels.
- Total operational greenhouse gas (GHG) emissions decreased one percent from 2020 to 2021 despite the opening of the Northgate Link Extension and OMF East and associated increases in electricity use.
- *Key findings in resource use and efficiency include:* Ridership modestly increased in 2021 from the 2020 pandemic lows, with passenger miles traveled (PMT) across all modes increasing 3 percent from the prior year and unlinked passenger trips ("boardings") increasing 12 percent. Agency vehicle revenue miles (VRM) increased by 8 percent in 2021. The disparity between the increases in PMT and boardings suggests that riders are taking a larger number of shorter trips in 2021.
- Corresponding with increased service levels, absolute (i.e. not normalized) resource use increased across the agency, with the exception of waste generation. Agency diesel consumption increased by slightly less than a percent from 2020 to 2021. Electricity for Link Light Rail traction power increased by 37 percent, reflecting increased service levels and the opening of the Northgate Link Extension in October of 2021. Facility natural gas and non-traction power electricity consumption increased by 15 percent and 20 percent respectively due in large part to greater seasonal temperature extremes.
- Agency energy use increased 6 percent from 2020 to 2021; absolute energy use was up 11 percent relative to the 2011 baseline. Overall increases in resource use were driven by increasing service levels, the opening of new facilities and weather conditions.
 - Absolute fleet energy use increased 3 percent from 2020 to 2021, which directionally mirrors the 8 percent increase in vehicle revenue miles operated from 2020 to 2021.

- Sounder commuter rail service increased energy consumption by 9 percent, Link light rail increased traction power consumption by 37 percent, and ST Express reduced energy consumption by 5 percent from 2020 to 2021.
- Meanwhile, absolute facility energy consumption increased 28 percent from 2020 to 2021, attributable in large part to new facilities opening.
- Water use increased by 17 percent from 2020 to 2021, due to a combination of warmer summer weather, leaks, and new facilities opening.
- Waste diversion from landfill increased from 31 percent in 2020 to 33 percent in 2021, which may be attributable to a gradual return of office workers to the central campus.

Notes on Appendix A: This document illustrates resource use trends over time from baseline years (2010 or 2011, depending on data) and the preceding inventory year, 2020. In the following graphs, solid bars indicate total emissions, resource use, and resource costs. The trend lines show the normalized resource, either per PMT or per VRM, over time.

Ridership and Level of Service

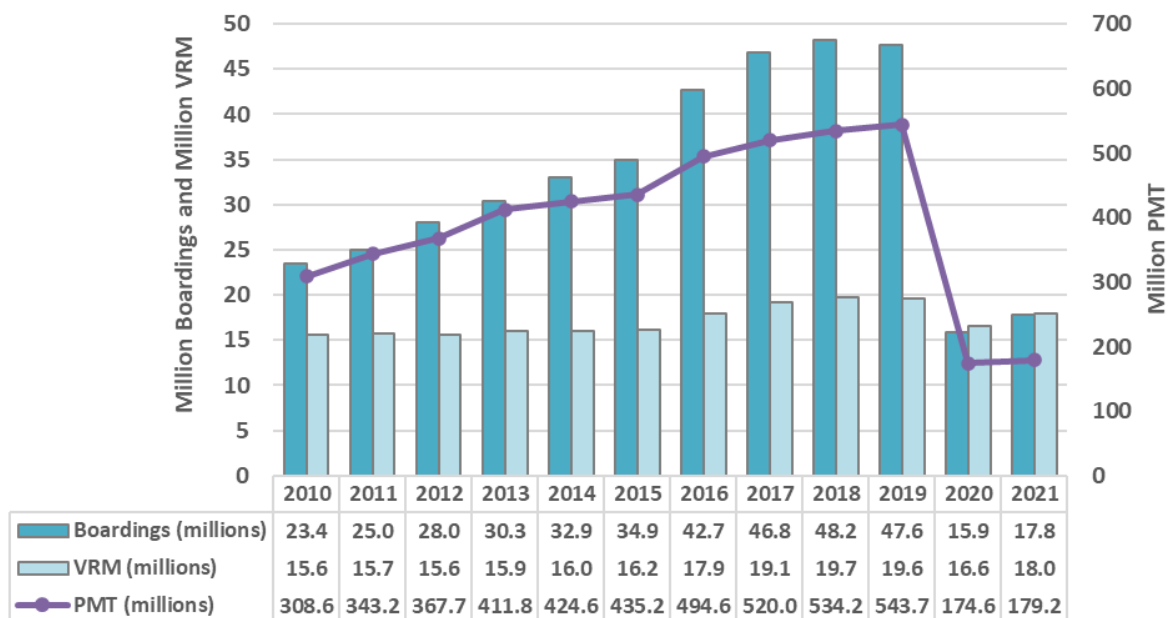
- Relative to 2010, ridership measured in boardings is down by 24 percent.
- Relative to 2010, vehicle revenue miles are up by 15 percent.
- From 2020 to 2021, boardings increased 12 percent, passenger miles traveled increased 3 percent and vehicle revenue miles increased 8 percent.

Ridership has important implications for resource use. As Sound Transit's network expands, the agency anticipates total resource use will increase. In order to account for the growth of Sound Transit's service network and meaningfully interpret resource efficiency trends over time, the Sustainability Inventory normalizes data by the level of service provided by the agency (vehicle revenue miles or VRM), the number of unlinked passenger trips (boardings or UPT) and the volume and distance of overall ridership (passenger miles traveled or PMT).

Boardings and PMT have generally increased year-over-year throughout the agency's history. However, 2020 saw the agency's first steep decline in ridership and all other metrics of resource use due to the COVID-19 pandemic. With the exception of Tacoma Link, VRM in 2020 fell significantly across all services, as did boardings.

In 2021, ridership and service levels modestly rose from the prior year but remain well below pre-COVID levels. Notably, the opening of the Northgate Link Extension in October of 2021 significantly boosted annual Link Light Rail ridership. Figure 1 below shows the trends of boardings, vehicle revenue miles, and passenger miles traveled since 2010.

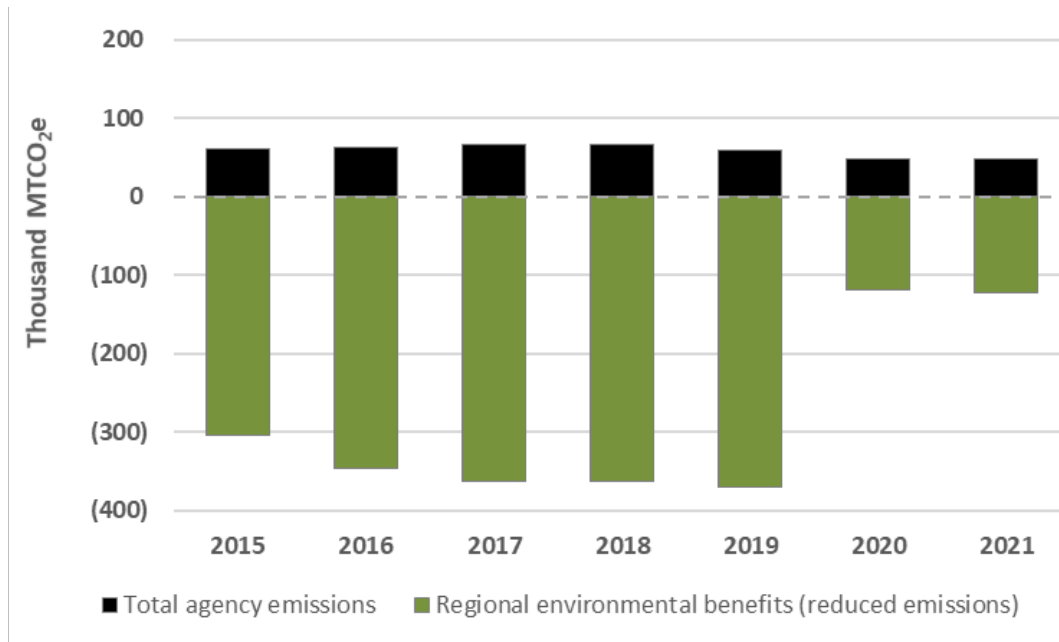
Figure 1. Ridership, 2010-2021



Regional Environmental Benefit

Increased transit use reduces regional environmental impacts from passenger vehicles. As more people choose transit over driving, fuel consumption and greenhouse gas (GHG) emissions are reduced throughout the region. Avoided GHG emissions are a measure of the regional environmental benefit produced by transit. Sound Transit employs a 2018 methodology developed by APTA to account for emissions avoided due to transit ridership, measured in carbon dioxide equivalent (CO₂e), as shown in Figure 2 and Table 1.

Figure 2. Regional Greenhouse Gas Emissions (CO₂e) Avoided by Sound Transit Services, 2015-2021



As seen in Figure 2 above and Table 1 below, even though 2020 and 2021 experienced significantly lower ridership, Sound Transit services still displace more GHG emissions than they emit from operations. For every ton of GHG emissions Sound Transit emitted in 2021, the region avoided roughly 2.5 tons of emissions through the benefits of transit. The regional environmental benefits shown in green in Figure 2 include the benefits from people taking transit instead of driving (i.e. mode shift) and reduced emissions associated with denser land use patterns supported by transit. Prior to the pandemic-induced decline in ridership, these benefits were between five and six times the agency's operational emissions, in black.

Table 1. Regional Greenhouse Gas Emissions (CO₂e) Avoided by Sound Transit Services, 2021

Regional metric tons CO ₂ e Reduced		
Mode Shift Benefits	Land-Use Benefits	Total Benefits
22,927	98,964	121,891
Avoided Emission Ratios - CO ₂ e units reduced in the region per unit of CO ₂ e from Sound Transit operations		
Mode Shift Benefits	Land-Use Benefits	Total Benefits
0.47	2.04	2.51

The definitions for each of the identified types of benefits are below:

- **Mode shift benefits** measure the reduced GHG emissions (amount avoided) resulting from shifting from one mode of transportation (i.e. single occupancy vehicle) to another (i.e. transit), measured on a PMT basis.
- **Land use change benefits** measure the reduced carbon emissions due to the denser land use patterns supported by transit systems.

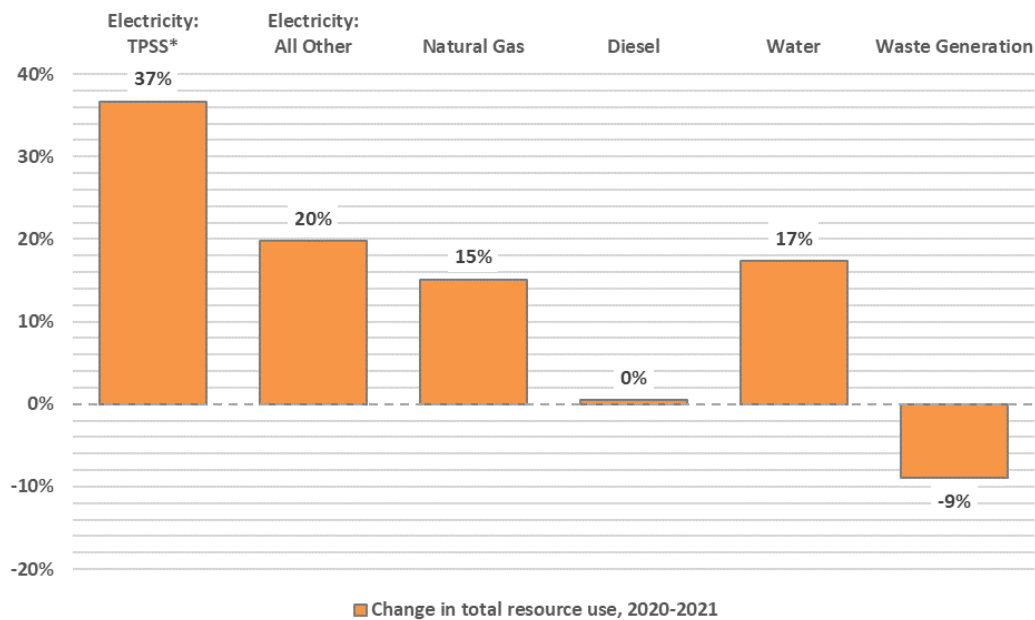
Resource Use

Total agency resource use has generally increased over time, reflecting the expansion of the Sound Transit system. Most increases in resource use have been directly in line with increased service levels and increased use of revenue fleet vehicles.

In response to public health restrictions and diminished ridership demand during the COVID-19 pandemic, Sound Transit reduced service levels significantly in 2020. As a result, resource use declined across most metrics. As ridership and service levels rose in 2021, resource use rebounded. Additionally, the opening of new service and facilities with Northgate Link increased resource consumption. Figure 3 below shows the change in absolute resource use from 2020 to 2021.

- Absolute resource use for traction power electricity (i.e. Link light rail propulsion) increased 37% from 2020 to 2021, while facility electricity consumption increased 20 percent. Traction power electricity consumption has increased 218 percent since 2011, while facility electricity consumption has increased 37 percent during that time.
- Total agency diesel consumption remained flat from 2020 to 2021. Diesel consumption is down 10 percent relative to the 2011 baseline.
- Facility natural gas consumption increased 15 percent in absolute terms from 2020 to 2021. Heating degree days, a measure of how cold it was during the heating season, increased 8 percent from 2020 to 2021, and likely drove the increase in natural gas consumption. Facility natural gas consumption has increased 116 percent since 2011.
- Absolute water use increased by 17 percent from 2020 to 2021, which aligns with a 17 percent increase in cooling degree days from 2020 to 2021. Water use has increased 54 percent relative to the 2011 baseline.
- Absolute waste generation declined nine percent from 2020 to 2021. Waste generation in 2021 was down 22 percent relative to the 2011 baseline.

Figure 3. Change in Absolute Resource Use, 2020-2021



Fleet Energy Use

- From 2020 to 2021, total fleet energy increased by 3 percent. Since 2011, total fleet energy use has grown by 6 percent.
- Per vehicle mile traveled, fleet energy has declined 5 percent since 2020 and 8 percent since 2011.
- Fleet energy use per PMT remained flat from 2020 to 2021, but is 103 percent greater than the 2011 baseline.

Prior to the COVID-19 pandemic, fleet energy use (in MMBTU) across Sound Transit's three modes—ST Express bus, Sounder commuter rail, and Link light rail—had been increasing slowly over time as more service was provided. Service became more efficient per PMT as system ridership grew significantly faster than level of service (VRM). Despite substantial pre-pandemic increases in service, 2020 reversed prevailing revenue fleet resource consumption trends as ridership and service levels both declined, resulting in lower absolute energy use, but higher energy use per PMT. In 2021, absolute fleet energy use rebounded slightly, while energy use per PMT remained flat and energy use per VMT decreased.

- Traction power electricity use for Link light rail in 2021 grew 218 percent since 2011 and increased 37 percent from 2020 to 2021.
- Diesel fuel use for Sounder commuter rail in 2021 was up 9 percent from 2011 consumption levels and up 9 percent from 2020 levels.
 - In March of 2020, Sounder reduced service levels from 34 daily trips to 18 daily trips; service increased in September 2020 to 22 daily trips. Special event service (i.e. for sporting events) was suspended from March through the end of 2020. In September 2021, Sounder restored 2 additional daily trips, hitting 24 daily trips.
- Diesel fuel consumption for ST Express buses in 2021 was down 17 percent from 2011 levels and declined 3 percent from 2020 to 2021.

- The composition of the ST Express fuel mix has changed over time; compressed natural gas (CNG) used in ST Express buses has increased from 5.7 percent of total ST Express fleet energy consumption in 2011 to 12.8 percent in 2020. CNG as a share of ST Express fleet energy declined to 11.1 percent in 2021. The long-term increase in agency CNG use since 2011 is largely the result of a growing prevalence of CNG buses in the Pierce Transit operated portion of the ST Express fleet.
- While both diesel and CNG buses saw reduced energy consumption in 2021, CNG buses saw a 17 percent decline in energy consumption from 2020, while diesel buses saw only a 3 percent decline. A shortage of drivers in 2021 incentivized a reallocation of drivers from shorter range CNG buses to longer range diesel buses.
- Although using CNG instead of diesel fuel reduces total GHG emissions and most criteria air pollutant emissions, including particulate matter (PM) and NO_x, CNG use does increase carbon monoxide (CO) emissions. (Air pollutants are discussed on pages A10-A14.)

Figure 4 and Figure 4 below show the trends in fleet energy use over time. Table 2 below shows the percent change in energy use from 2020 to 2021 per mode, as well as the percent change in efficiency (fuel use normalized by PMT for each mode).

Figure 5. Revenue Fleet Energy Use (Normalized by PMT), 2015-2021

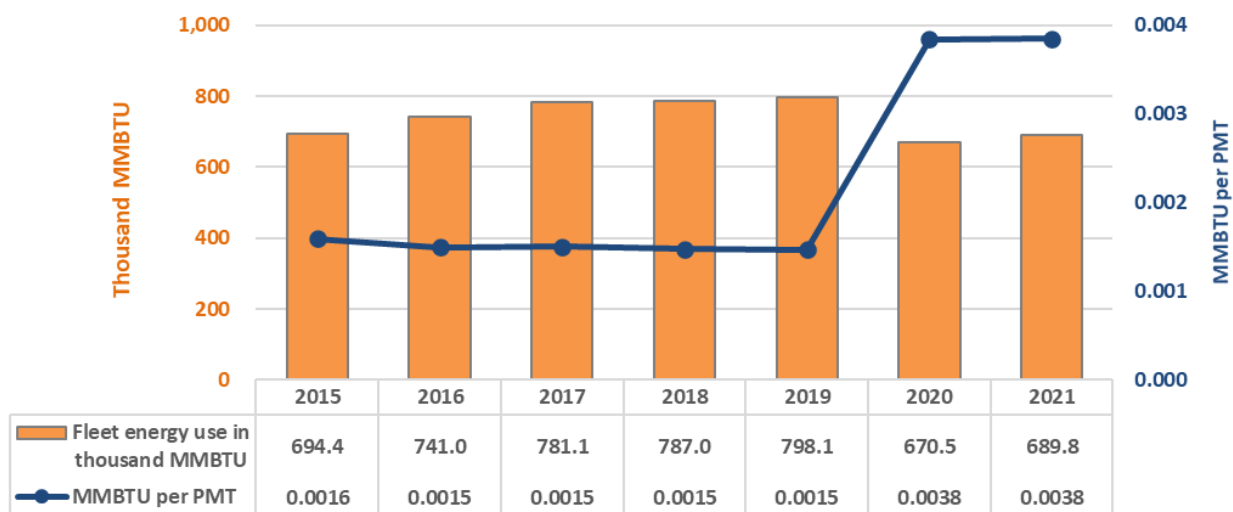


Figure 6. Revenue Fleet Energy Use (Normalized by VRM), 2015-2021

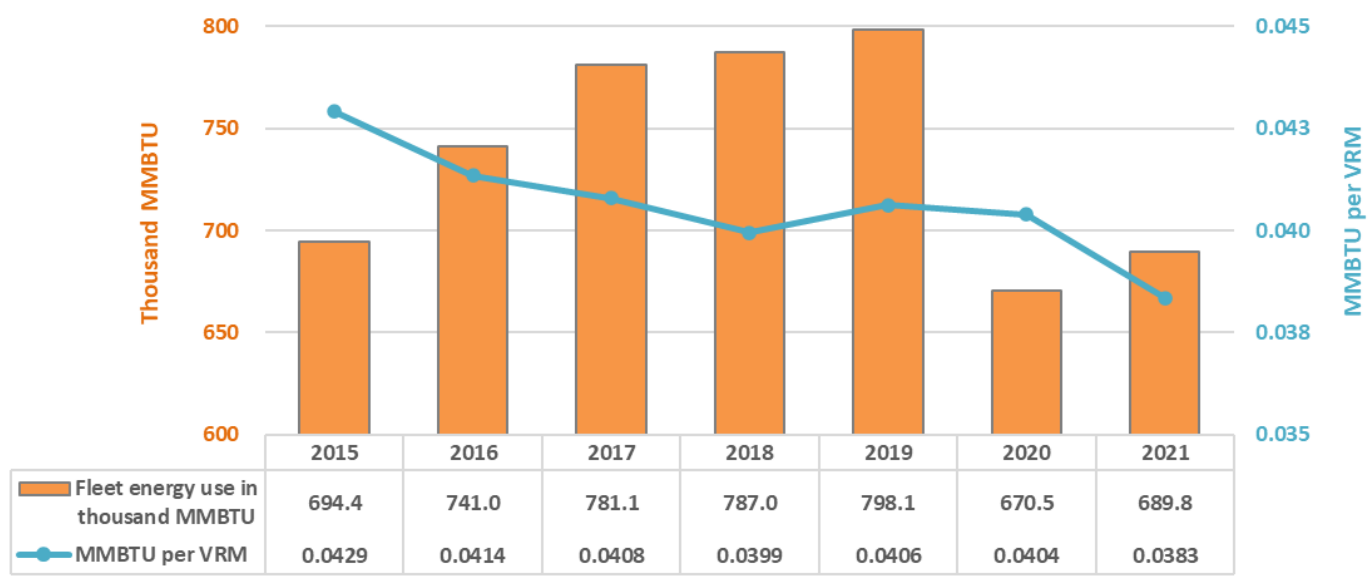


Table 2. Change in Energy Use by Mode, 2020-2021

Mode	% Change in Total Energy Use	% Change in Energy Use per PMT	% Change in Energy Use per VRM
Sounder Commuter Rail (diesel)	+9%	+87%	+5%
ST Express Buses (diesel and CNG)	-5%	+19%	0%
Link light rail traction power (electricity)	+37%	-21%	-5%

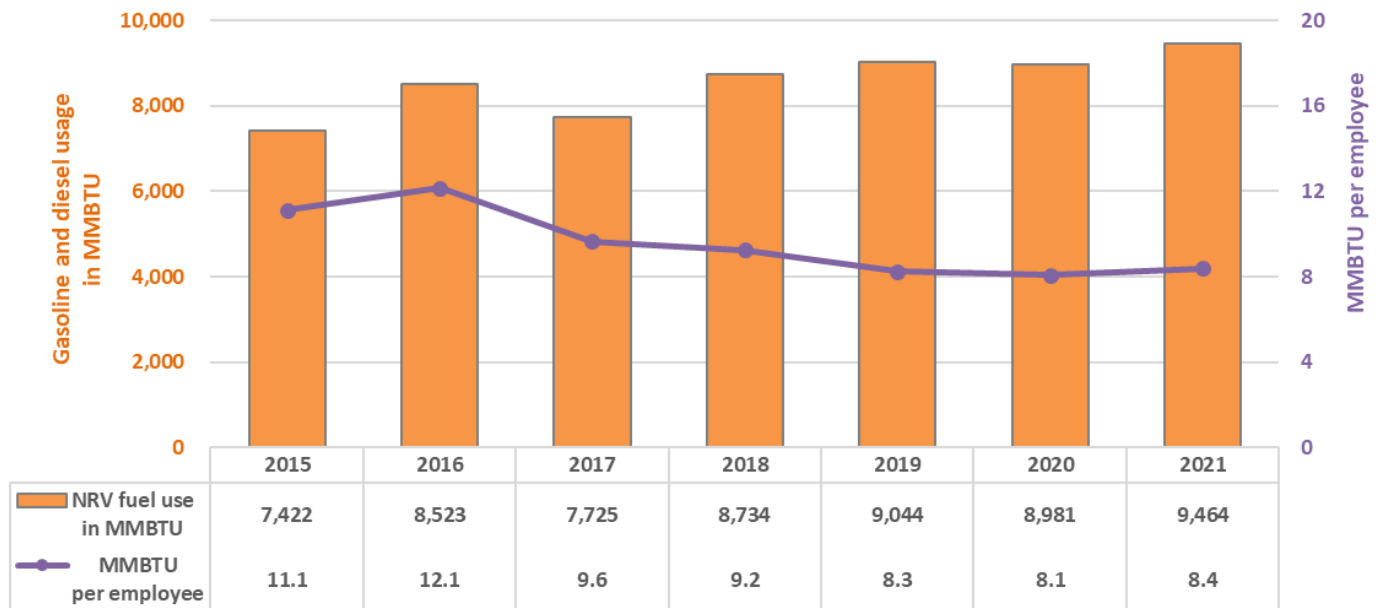
Note: Mode energy use is normalized by PMT and VRM specific to each mode.

Non-Revenue Fleet Energy Use

- Since 2011, non-revenue fleet energy use has increased by 19 percent overall but decreased by 44 percent per employee.
- From 2020 to 2021, non-revenue fleet energy use increased by 5 percent while increasing by 4 percent per employee.

Energy use for the agency's non-revenue fleet has remained relatively stable over time, with some fluctuations from year to year, as shown in Figure 6. Non-revenue fleet energy use was 19 percent higher in 2021 than in the 2011 baseline year. While the agency's headcount has increased every year, contributing to more driving of NRV fleet vehicles, Sound Transit has also purchased more hybrid and fully electric vehicles, helping to reduce per-mile and per-employee energy use and air pollutant emissions. Prior to the COVID-19 pandemic, the agency encouraged employee use of carpooling or transit whenever feasible.

Figure 7. Non-Revenue Fleet Energy Use, 2015-2021



Facility Energy Use

- Total facility energy use was up 55 percent in 2021 from the 2011 baseline.
- From 2020 to 2021, total facility energy use increased by 28 percent.
- Facilities built before 2018 decreased energy consumption by 0.2 percent in 2021 relative to a 2018 baseline.*

As the agency has brought additional stations and facilities online, facility energy use has generally increased. October 2021 saw the opening of the 4.3 mile Northgate Link Extension, which added the U District, Roosevelt, and Northgate stations to the Link network.

Although many Sound Transit facilities remained operational throughout the height of the COVID-19 pandemic, a large proportion of Sound Transit's office staff have worked remotely since March 2020. Some office staff returned to office in a limited capacity during 2021, but generally, office utility consumption has remained lower than pre-pandemic levels. Service facilities like the Sounder Century Yard Operations Building, which saw less operational activity and energy consumption in 2020, experience a rebound in operational activity and energy consumption in 2021.

From 2020 to 2021, total facility electricity use increased 28 percent but varied substantially by line of business. Although electricity consumption is subject to external factors like weather and the growth of the network, Sound Transit continues to implement facility energy efficiency measures aimed to reduce agency electricity consumption.

The substantial increase in facility energy consumption is at least partially attributable to an observed increase in heating degree days and cooling degree days from 2020 to 2021.

* 2019 Sustainability Plan Key Performance Indicator

Notable electricity consumption trends include:

- Link light rail facilities increased electricity consumption by 29 percent, largely attributable to the opening of the three new stations of the Northgate Link Extension and the opening of OMF East, as well as increased operational activity in the Central Link OMF.
- Sounder facilities increased electricity consumption 21 percent from 2020 to 2021, as service levels rebounded from pandemic levels.
- Across owned and leased properties, Sound Transit administrative facilities decreased electricity consumption in 2021 by 2 percent.
- ST Express facilities increased electricity consumption by 9 percent, roughly returning to the pre-pandemic level.

Figure 8. Facility Energy Use (Normalized by PMT), 2015-2021

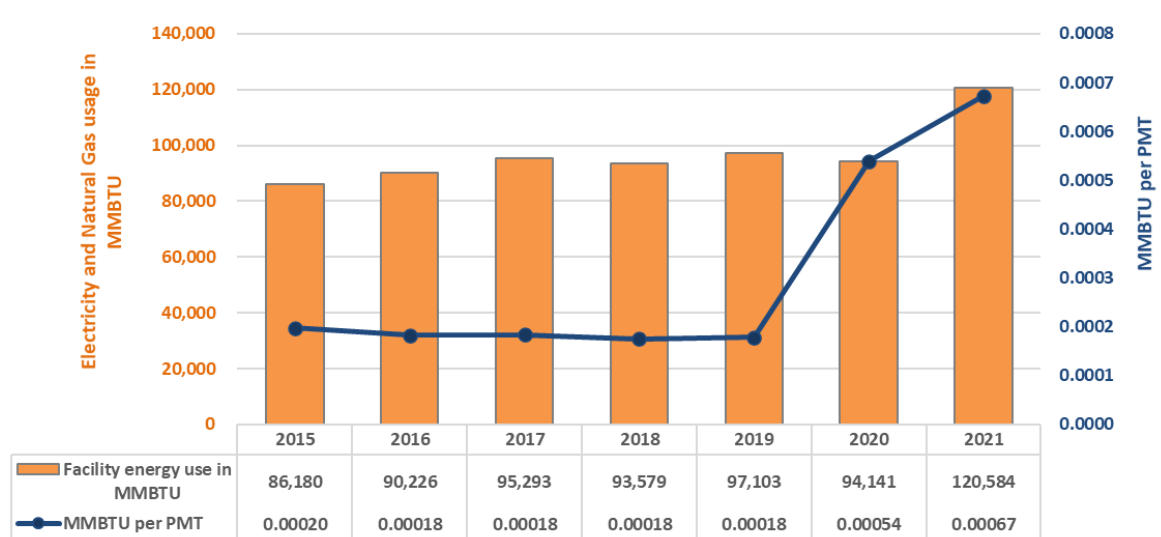
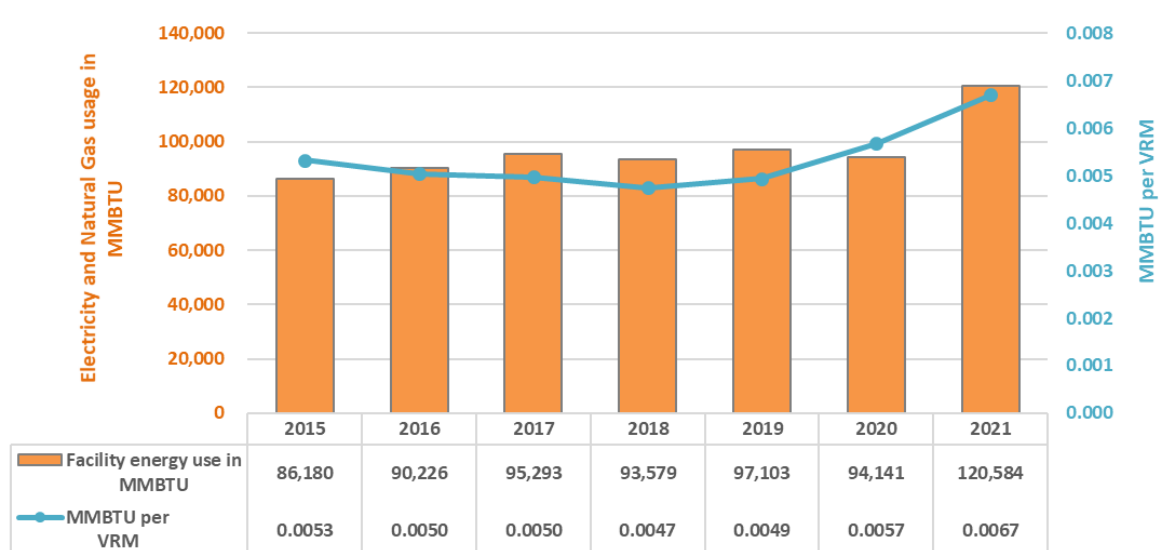


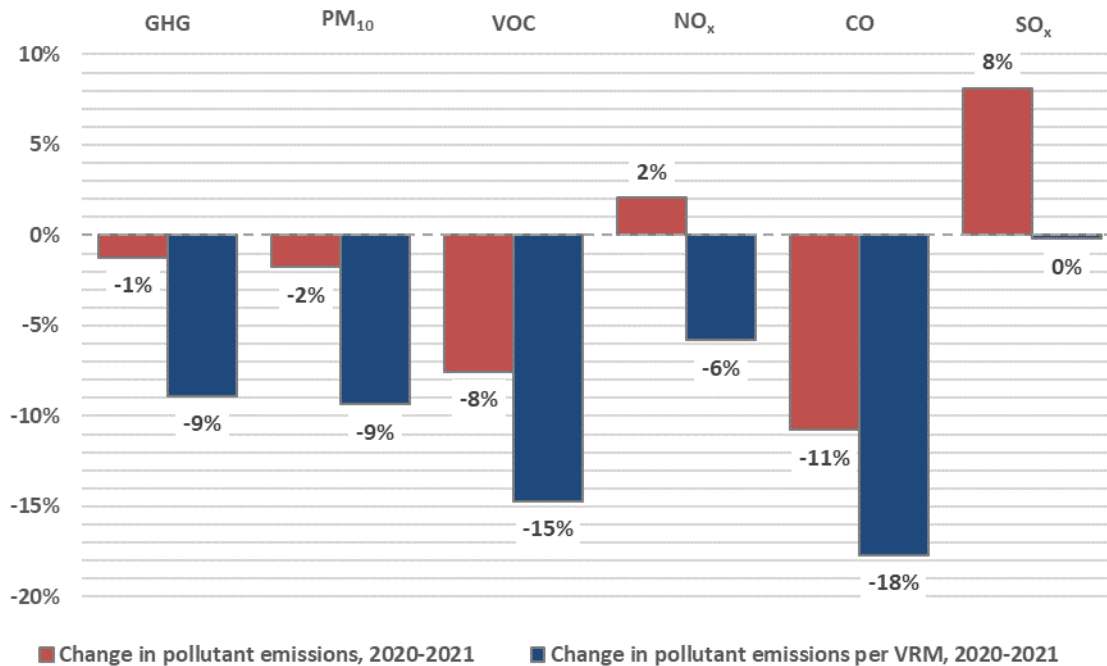
Figure 9. Facility Energy Use (Normalized by VRM), 2015-2021



Air Pollutant Emissions

The sections below illustrate the trends in GHG emissions and criteria air pollutant emissions from Sound Transit vehicle and facility operations. Figure 9 below shows the total percent change and the change normalized per vehicle revenue mile by pollutant type from 2020 to 2021. As noted above, agency VRM increased by 15 percent from 2020 to 2021.

Figure 10. Changes in Pollutant Emissions, 2020-2021; Change in Pollutant Emissions per VRM, 2020-2021



Greenhouse Gas Emissions

- Relative to the 2011 baseline, agency greenhouse gas (GHG) emissions are down 20 percent in 2021.
- From 2020 to 2021, agency GHG emissions decreased 1 percent, despite the opening of Northgate Link.
- Relative to 2018, agency GHG emissions are down 27 percent in 2021.*

As Sound Transit service and ridership increased from 2011 to 2019, agency GHG emissions in metric tons CO₂ equivalent (MTCO₂e) remained relatively stable in absolute terms and had been declining on a normalized basis. There were multiple factors that resulted in a drop in absolute agency GHG emissions and a spike in GHG emissions per PMT in 2020, as pictured in Figure 10; decreased services levels led to reduced fuel consumption, while the substantial drop in ridership drove ridership-normalized metrics upward. Absolute emissions and emissions normalized per PMT remained relatively flat from 2020 to 2021; emissions normalized per VRM continued a downward trajectory.

* 2019 Sustainability Plan Key Performance Indicator

Figure 11. Agency GHG Emissions (Normalized by PMT), 2015-2021

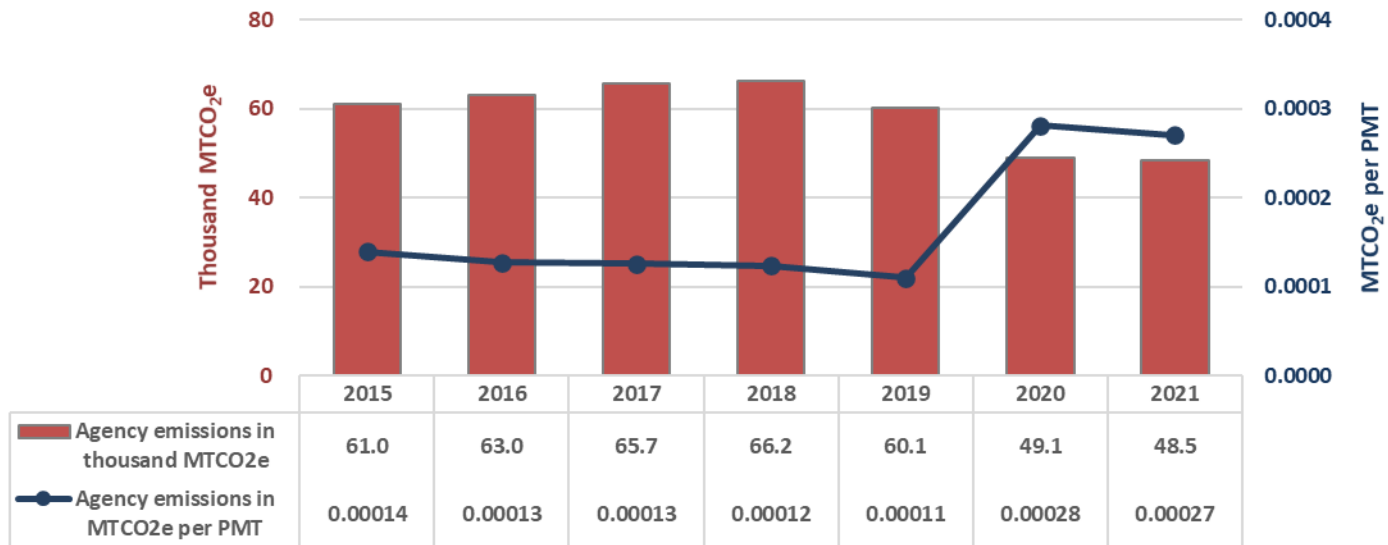


Figure 12. Agency GHG Emissions (Normalized by VRM), 2015-2021

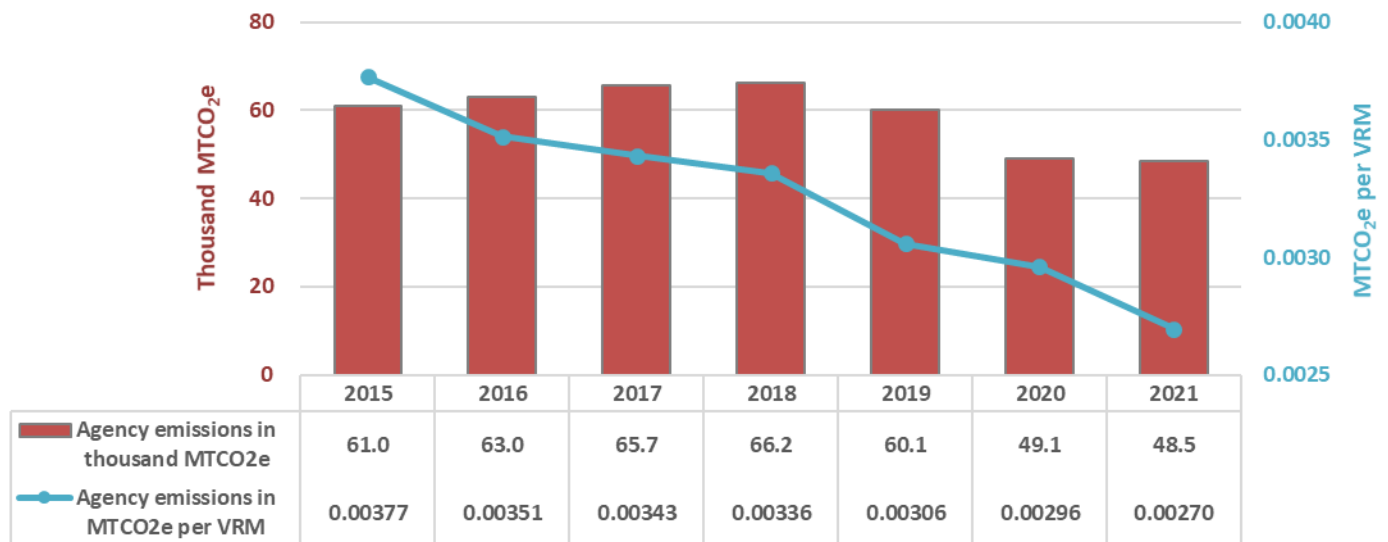
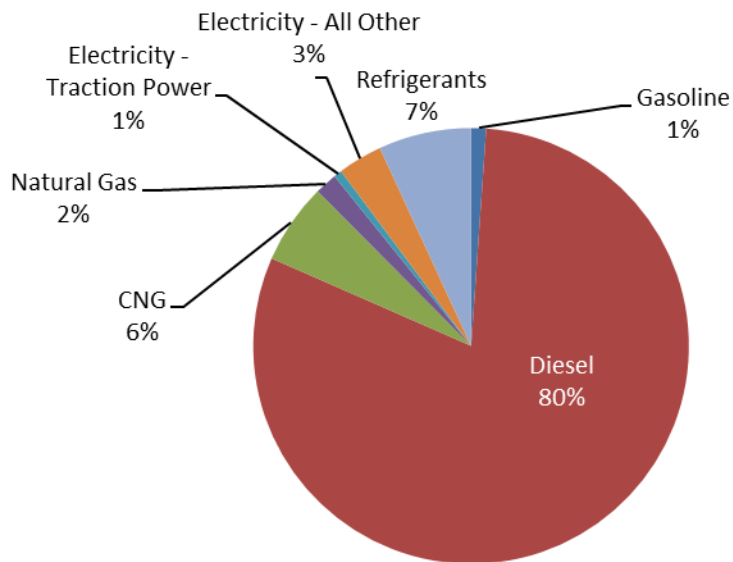


Figure 13. Greenhouse Gas Emissions by Energy Source, 2021



Criteria Air Pollutants

Table 3. Change in Criteria Air Pollutant Emissions

Pollutant	Change 2011-2021 (Absolute)	Change 2020-2021 (Absolute)
PM ₁₀	-66%	-2%
VOCs	-71%	-8%
NO _x	-46%	+2%
CO	-78%	-11%
SO _x	+8%	+8%

- The service levels of Sound Transit's fossil fuel powered modes of transit moved in different directions from 2020 to 2021. VRM for ST Express Bus service decreased by 4.7 percent, while VRM for Sounder Commuter Rail increased 3.7 percent. As a result, the 2020-2021 changes in criteria air pollutants (CAPs) emissions were mixed. Particulate matter (PM₁₀), volatile organic compounds (VOCs), and carbon monoxide (CO) decreased, while nitrogen oxides (NO_x) and sulfur oxides (SO_x) increased.
- From the 2011 baseline, CAP emissions have all decreased substantially, with the lone exception of SO_x, which has seen greater interannual variability.

Sound Transit's long-term reduction in CAP emissions has been driven in part by ST Express's gradual shift from reliance on diesel buses to diesel-electric hybrids and CNG buses, as well as general improvements in emission controls. The agency has also upgraded all Sounder commuter rail engines to reduce air pollution.

The figures below show the absolute and normalized change in PM₁₀ and CO emissions since 2015. These criteria air pollutants are down 66 percent and 78 percent since 2011, respectively. From 2020 to 2021 CO emissions

decreased more so than any other CAP, due to improved emission controls on CNG buses, which characteristically emit greater volumes of CO. The noticeable drop in CO emissions starting in 2016 is primarily due to phasing out model year 2001 CNG buses.

Figure 14. Particulate Matter (PM₁₀) Emissions (Normalized by PMT), 2015-2021

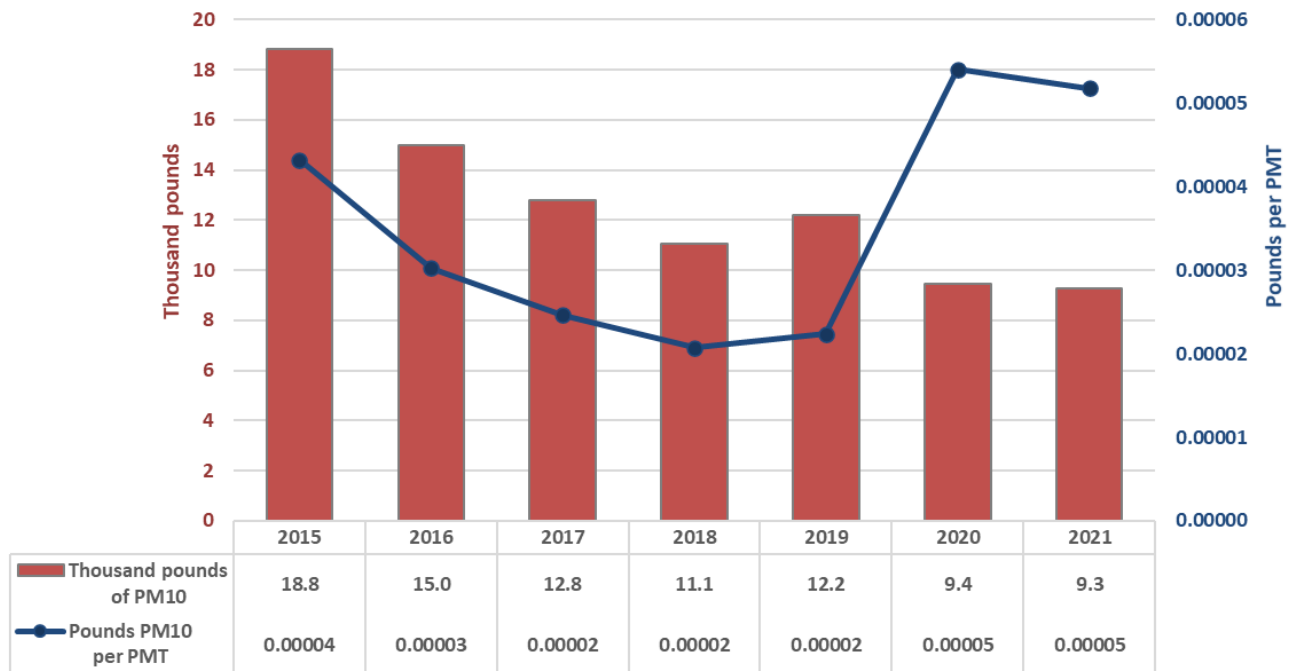


Figure 15. Particulate Matter (PM₁₀) Emissions (Normalized by VRM), 2015-2021

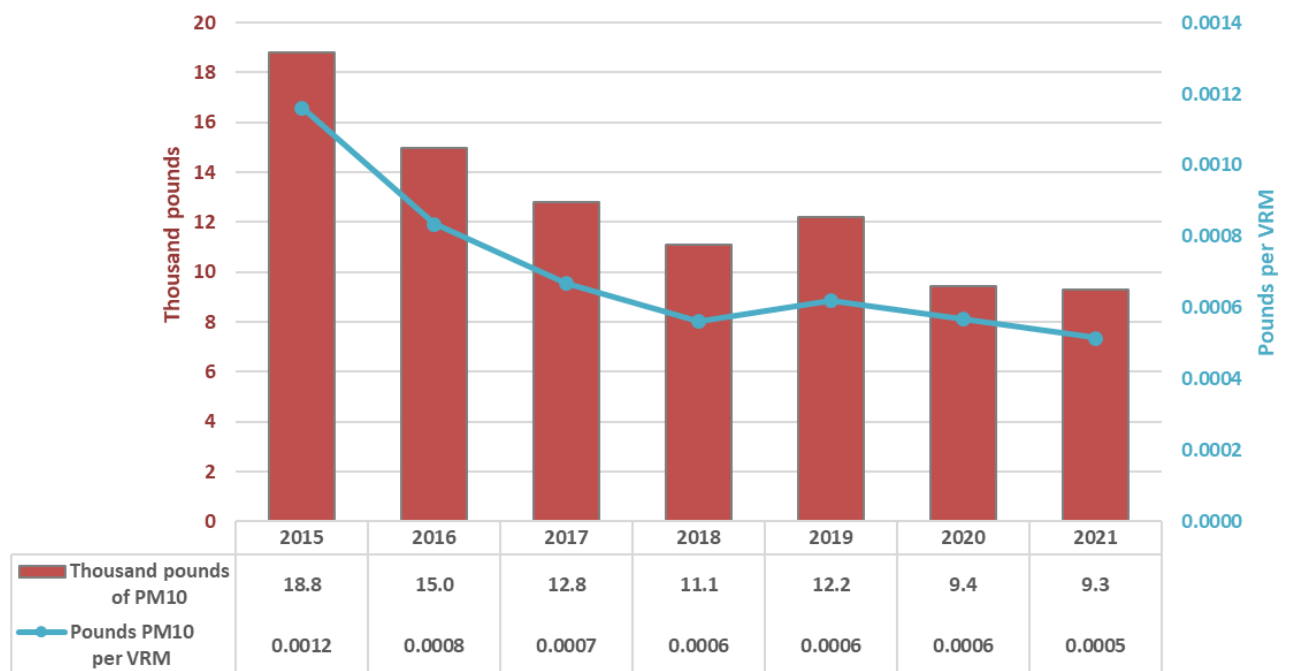


Figure 16. Carbon Monoxide (CO) Emissions (Normalized by PMT), 2015-2021

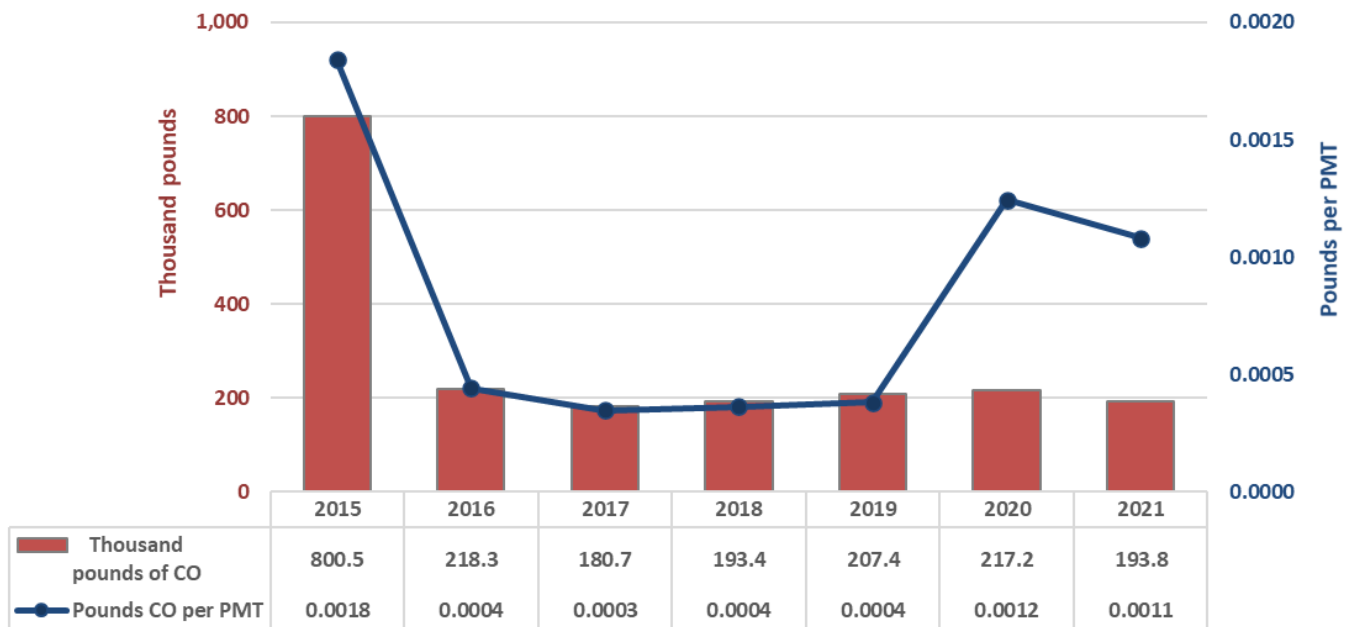
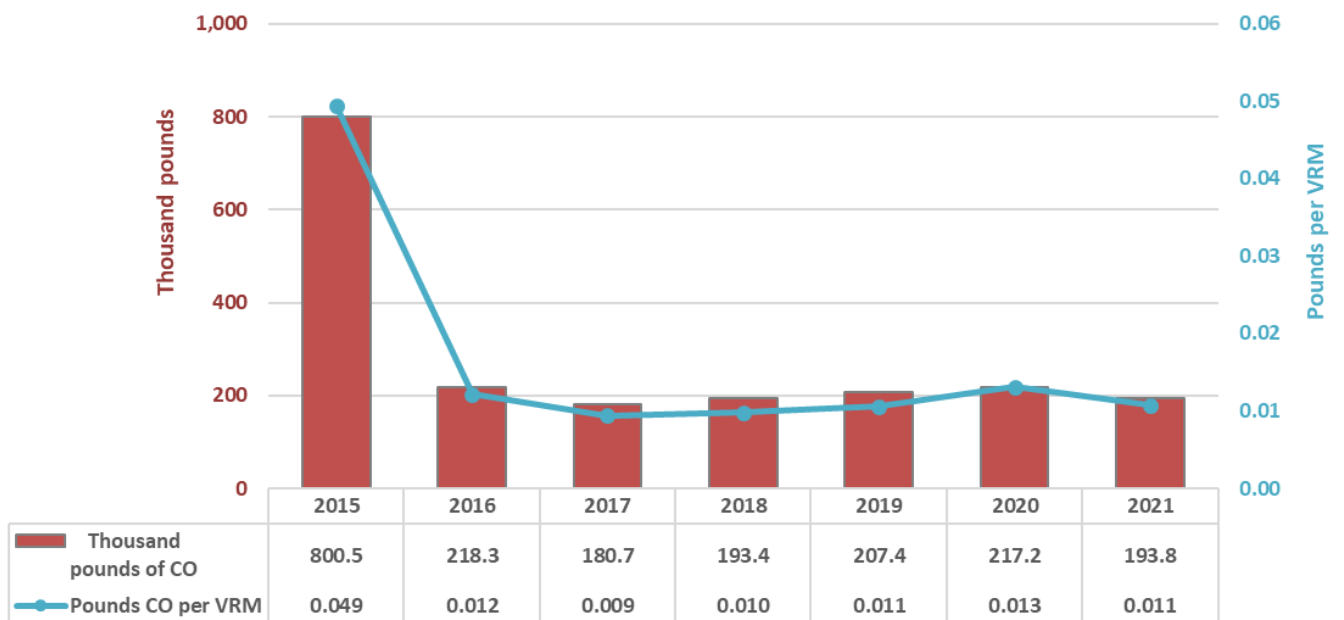


Figure 17. Carbon Monoxide (CO) Emissions (Normalized by VRM), 2015-2021

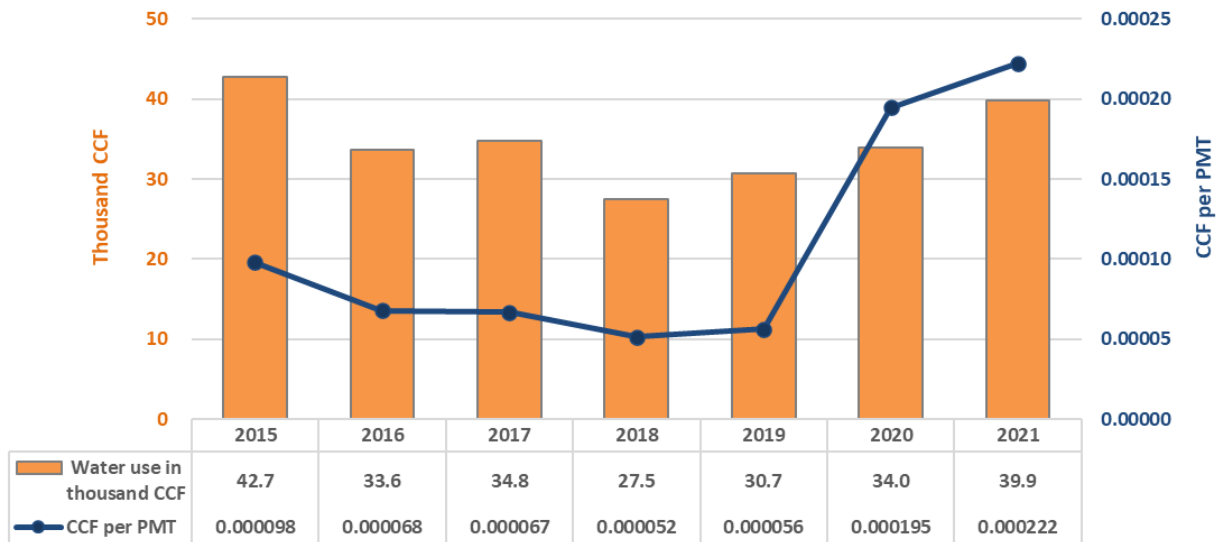


Water Use

- Since 2010, water use has grown by 55 percent in total.
- From 2020 to 2021, water use increase by 17 percent in total.

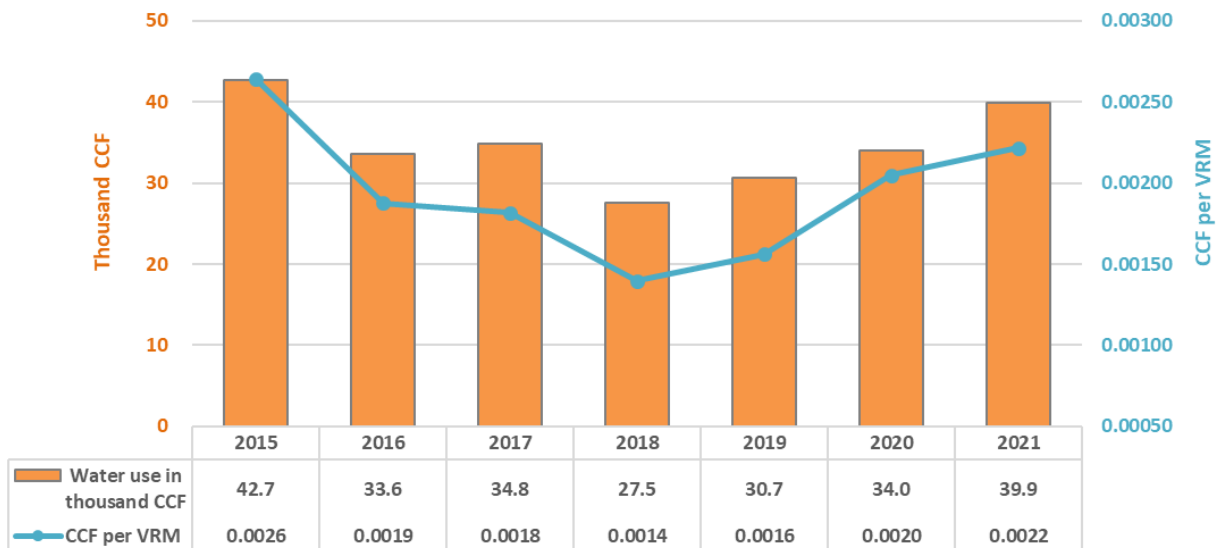
- Total agency water use is primarily driven by landscape irrigation and is therefore variable from year to year. Irrigation-related leak incidents, hotter weather, and the installation of landscaping features at new stations drove much of the additional water consumption observed in 2021.
- Changes in agency water consumption from the prior year varied across agency functions in 2021. Maintenance facilities increased water consumption 81 percent from the prior year, largely reflective of the opening of OMF-East. Customer facilities increased consumption 9 percent and administrative facilities reduced water consumption 23 percent.

Figure 18. Water Use (Normalized by PMT), 2015-2021



Note: 1 CCF equals 100 cubic feet, or 748 gallons

Figure 19. Water Use (Normalized by VRM), 2015-2021



Waste Generation

- Since 2010, waste generation has declined by 28 percent.
- From 2020 to 2021, waste generation decreased 9 percent.

While acknowledging substantial inter-annual variability, waste generation at Sound Transit facilities has declined 28 percent since 2010 as service and agency staff have increased. The total amount of garbage sent to landfill has declined 34 percent over the same timeframe, while the rate at which recyclables and compost have been diverted from the landfill has hovered between a low of 27 percent (2010) and a high of 39 percent (2014), achieving a diversion rate of 33 percent in 2021.

Since 2010, the agency has worked to improve solid waste diversion from landfill by enhancing employee recycling education and implementing paper towel composting in the restrooms at agency offices. In 2016, the disposal bins at the Central Link OMF facility were too small for the volume of garbage, leading to co-mingling of solid waste and recyclables, until bins were upgraded. This problem underscores the importance of ongoing assessment and education, as well as appropriate infrastructure, to support recycling and composting efforts. The COVID-19 pandemic resulted in a shift of the administrative staff in 2020 to remote work, which in turn decreased office recycling and composting volumes as a component of the total agency waste stream.

- Composting quantities in 2021 increased 6 percent from the prior year, while recycling quantities decreased 16 percent. The agency's total diversion rate during that period increased from 31 to 33 percent, as pictured in Figure 19 below.
- Waste diversion rates for central office facilities are substantially higher than for other facilities. As depicted in Table 4 below, the diversion rate from landfill for central office facilities remained in the 60-64% range prior to the COVID-19 pandemic but sank to 50% with the move of the administrative staff to remote working in 2020. In 2021, the central office diversion rate spiked to 72% as some staff returned to office.

Figure 20. Waste Generation and Diversion, 2015-2021

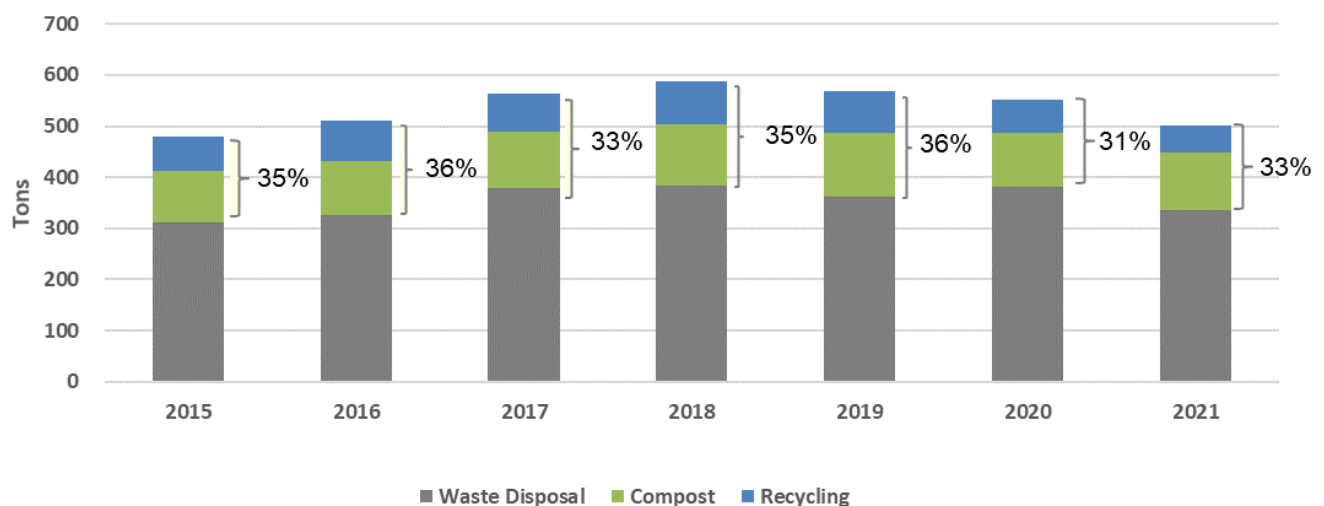


Table 4. Waste Diversion Rates by Facility Type

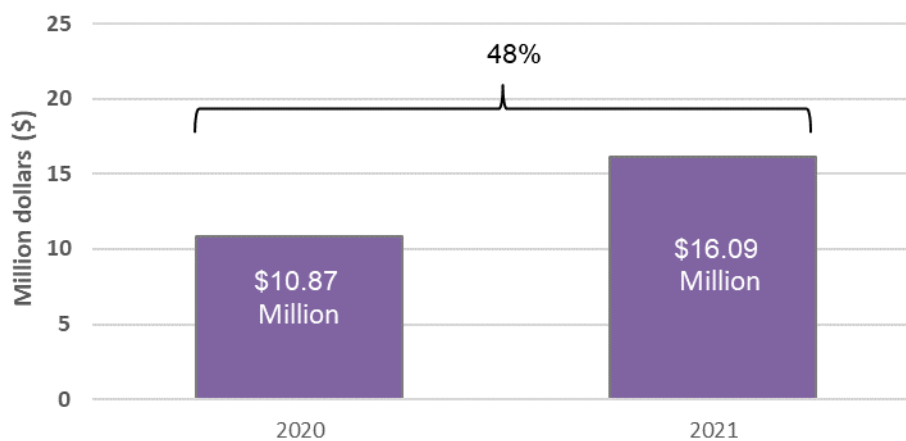
Year	Central Office	Other Facilities	Total
2015	64%	25%	35%
2016	66%	24%	36%
2017	61%	22%	33%
2018	60%	23%	35%
2019	61%	24%	36%
2020	50%	24%	31%
2021	72%	24%	33%

Fuel and Utility Expenses

- Relative to 2010 levels, fuel costs for ST Express buses and Sounder commuter rail are down 7 percent.
- From 2020 to 2021, fuel costs increased by 64 percent.
- Since 2010, utility costs have increased by 199 percent.
- From 2020 to 2021, utility costs increased by 30 percent.

Resource costs across categories have generally trended upward since 2010. However, the COVID-19 pandemic in 2020 resulted in a substantial decrease in revenue vehicle fuel expenses and a more modest decline in facility resource expenditures due to lower consumption. In 2021, overall spending on fuel rebounded from the 2020 lows as a result of greater consumption and rising fuel prices. Figure 20 below shows the change in agency operating costs for fuel and utilities from 2020 to 2021. Vehicle revenue miles increased 8 percent in this period.

Figure 21. Fuel and Utility Expenses, 2020-2021



Fuel Costs

- Fuel costs for ST Express buses and Sounder commuter rail have decreased by 7 percent since 2010 and increased by 64 percent from 2020 to 2021.
- Transit vehicle fuel use accounted for 58 percent of Sound Transit's fuel and utility expenses in 2021, up from 52 percent in 2020.
- In 2021, transit vehicle fuel expenses accounted for roughly 2.4 percent of Sound Transit's operating budget, up from 1.5 percent the prior year.

Figure 22. Sounder and ST Express Fuel Costs (Normalized by PMT), 2015-2021

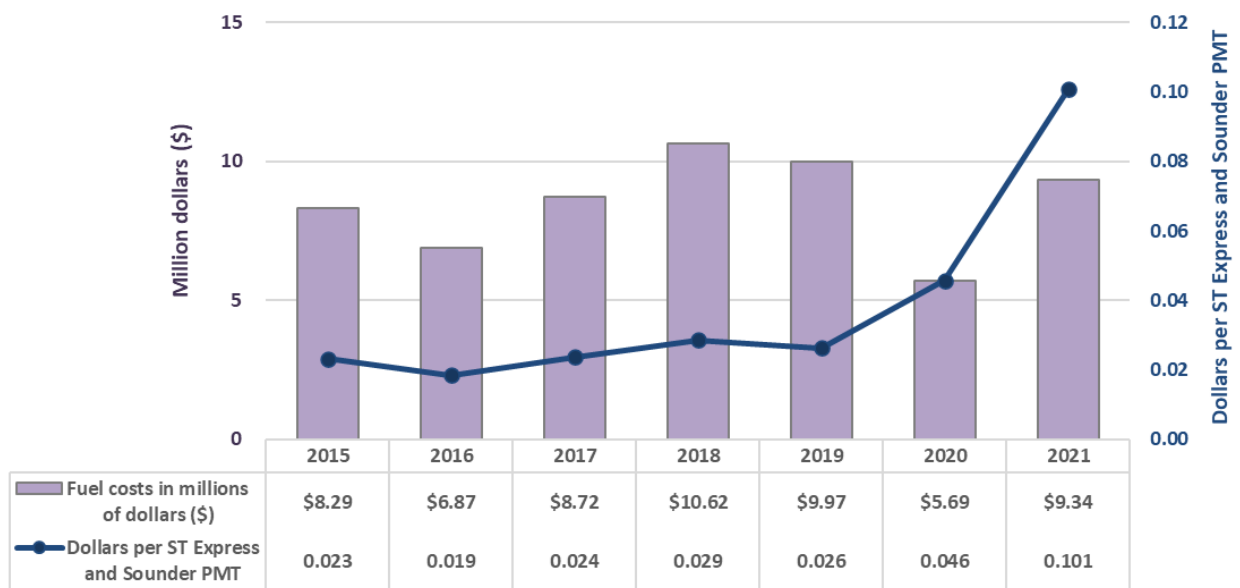
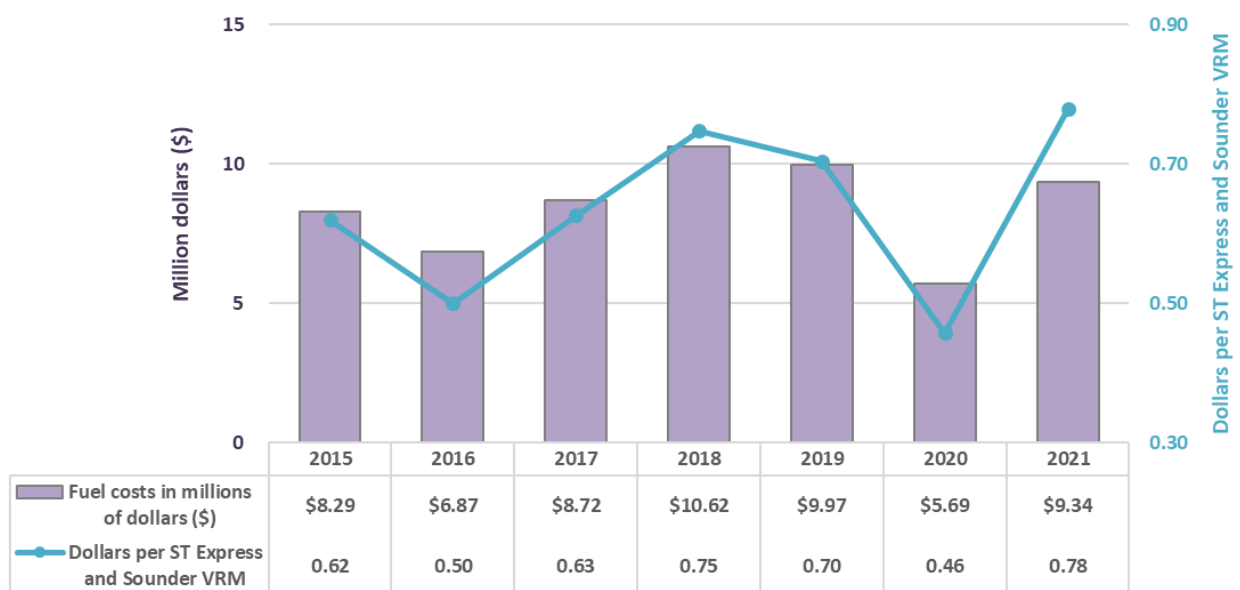


Figure 23. Sounder and ST Express Fuel Costs (Normalized by VRM), 2015-2021



Other Utility Expenses

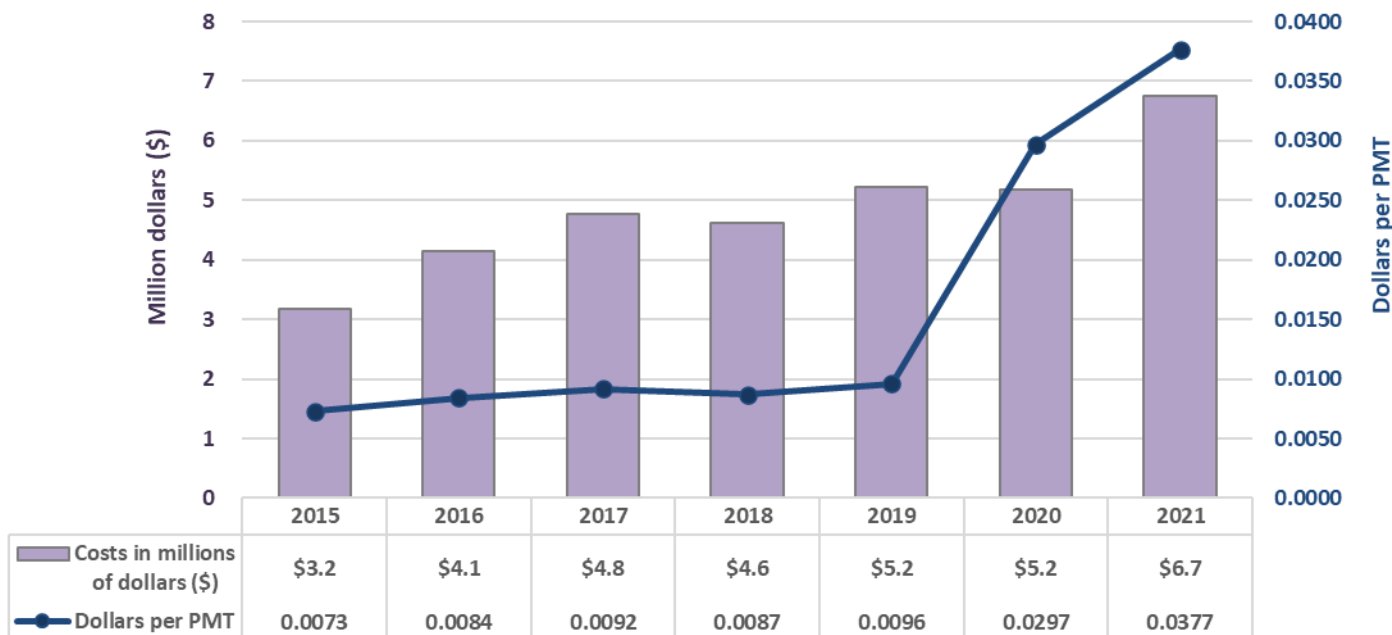
- Since 2010, utility costs have increased by 199 percent.
- Utility costs increased by 30 percent from 2020 to 2021.

Table 5. Change in Utility Costs

	Change 2010-2021 (Absolute)	Change 2020-2021 (Absolute)
Traction power electricity costs	+260%	+33%
Facility electricity costs	+188%	+31%
Facility natural gas costs	+133%	+28%
Water costs	+30%	+8%
Waste, recycling, and compost cost	+105%	-2%

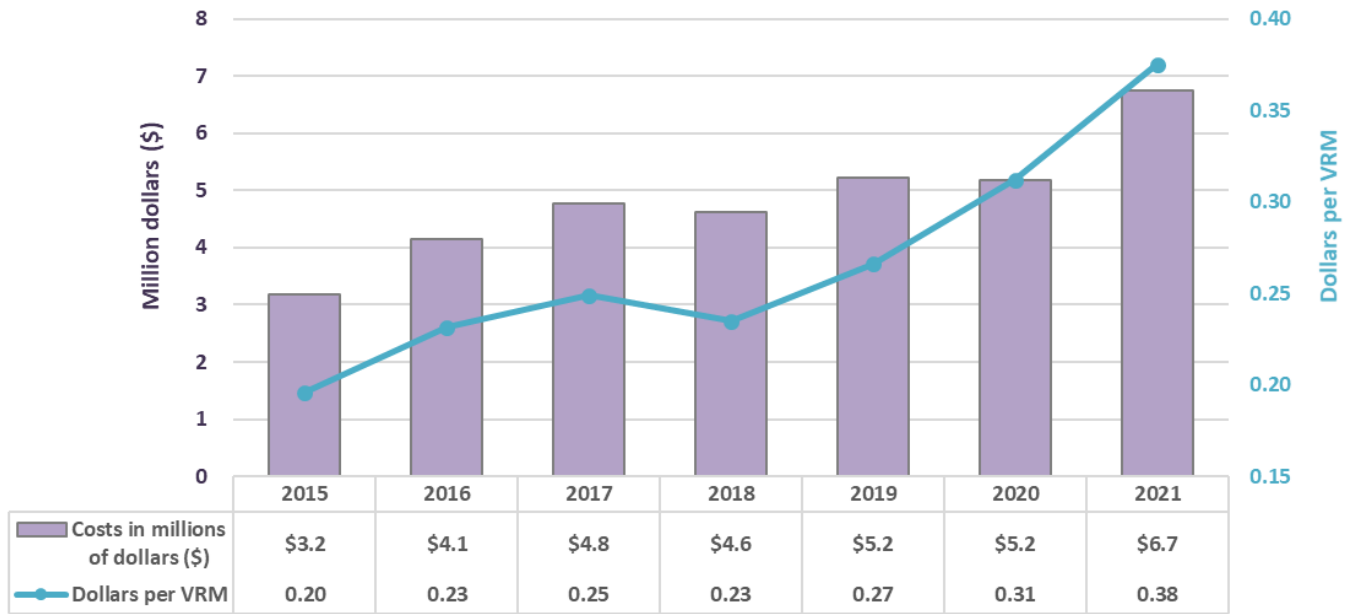
Utility expenses for electricity, water, and waste have increased over time in line with usage trends. Figure 23 below shows the change in resource costs since 2015. Total facility electricity costs since 2010 have increased by 188 percent and waste costs have increased by 105 percent. Water costs have increased by 30 percent during that period but experience inter-annual volatility. The agency's fuel expenses have fluctuated with the volatility in petroleum prices, while other resource costs have increased more steadily.

Figure 24. Non-Vehicle Utility Costs (Normalized by PMT), 2015-2021



Note: Stormwater and sewer costs are not included.

Figure 25. Non-Vehicle Utility Costs (Normalized by VRM), 2015-2021



Appendix B – 2021 Sustainability costs and savings

The table below summarizes a sample of costs and savings from resource conservation projects completed as of the end of 2021. This data captures many significant monetary costs and savings. However, projects may have additional sustainability benefits that cannot be represented as financial savings – from reduced maintenance cycles to improved air quality.

Note that the savings figures below do not include labor and material cost savings related to improved operations and maintenance efficiency. Payback year estimates do reflect applicable grants and or rebates. Many projects with long payback periods still incur significant labor and material cost savings and reduce the frequency of maintenance.

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2021 SAVINGS	SAVINGS TO DATE, 2021	PAY-BACK YEAR	DESCRIPTION
ST Express mid-day bus storage	2008	\$0	\$70,797	\$2,128,414	2008	This program allows Pierce County buses to stay in Seattle until the afternoon commute to avoid driving back empty.
Sounder automatic engine start-stop system	2009	\$230,596	\$197,211	\$1,261,156	2013	This equipment was installed to shut down Sounder commuter rail engines when not in use, and reduces engine idling time by about 34 percent and significantly reduces air pollution.
Sounder Lakewood-Seattle wayside power	2010	\$490,000	\$99,701	\$1,015,175	2015	Electric wayside power units are used instead of the commuter rail locomotives' diesel engines to heat and power coach cars during layover, reducing diesel use and air pollutant emissions. Wayside units were installed in Tacoma in 2010 and were then moved to Lakewood in 2013, where more units were added.
Sounder Everett-Seattle wayside power	2011	\$315,000	\$7,127	\$250,331	2019	
Central Link OMF sewer deduct meter	2012	\$2,600	\$48,342	\$321,990	2012	This Central Link light rail Operations and Maintenance Facility meter reduces water costs by accounting for irrigation water that does not enter the wastewater stream.
Union Station HVAC controls upgrade*	2013	\$405,778	\$25,581	\$204,792	2022	The agency upgraded the controls for the Union Station Heating, Ventilation and Cooling (HVAC) system.
Federal Way Transit Center garage lighting upgrades*	2013	\$579,334	\$32,436	\$259,662	2023	Three transit facility garages were retrofitted for LED lighting. These locations included Federal Way Transit Center, Kent Sounder station and Auburn Sounder station.
Kent Station garage lighting upgrades*	2013	\$99,773	\$5,766	\$46,162	2022	
Auburn Station garage lighting upgrades*	2013	\$208,985	\$11,533	\$92,324	2023	

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2021 SAVINGS	SAVINGS TO DATE, 2021	PAY-BACK YEAR	DESCRIPTION
Angle Lake Station solar power	2016	N/A – Installed as part of Design Build project	\$1,503	\$7,751	N/A	14 KW solar array system on the Angle Lake Station platform canopy and 50 KW solar array system on the Angle Lake Garage pedestrian walkway. These solar panels were installed in the original design build contract for the facility.
Angle Lake Garage solar power	2016		\$2,069	\$18,251	N/A	
Kent Station lighting upgrades*	2017	\$169,849	\$10,210	\$48,616	2030	Kent, Sumner and Puyallup Stations were upgraded with LED lighting.
Sumner Station lighting upgrades*	2017	\$138,967	\$10,250	\$48,807	2027	
Puyallup Station lighting upgrades*	2017	\$169,849	\$10,622	\$50,578	2029	
OMF interior and exterior LED lighting and EMS controls upgrade*	2018	\$1,065,415	\$70,944	\$269,587	2026	The building control system was upgraded at the Operations and Maintenance Facility, which allows for improved building mechanical operations. The inefficient lighting was replaced with LED in the maintenance shop and exterior parking areas.
Mukilteo Parking Lot lighting upgrades	2018	\$13,150	\$3,558	\$12,770	2021	Parking lot lighting was retrofitted with LED lights near Mukilteo Station.
Issaquah Transit Center lighting upgrades*	2018	\$161,514	\$8,921	\$231,920	2035	Lighting was upgraded to LEDs at the Issaquah Transit Center, Mercer Island Park & Ride, and King St. Stations from parking garages and station platforms to area lighting.
Mercer Island Park and Ride lighting upgrades*	2018	\$191,424	\$8,402	\$29,810	2038	
King St. Station lighting upgrades*	2018	\$245,262	\$4,966	\$14,912	2066	
Sounder Yard solar power	2018	N/A - Installed as part of Design Build project	\$200	\$793	N/A	2.1 KW solar array system on the Sounder Yard facility. These solar panels were installed in the original design build contract for the facility.
Light Rail vehicles lighting upgrades	2019	\$137,022	\$16,837	\$47,789	2024	Interior lighting and headlights on Link Light Rail were upgraded to LED, which reduced lighting energy use by 45%. The project also improved visibility and reduced maintenance requirements for the lighting system.

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2021 SAVINGS	SAVINGS TO DATE, 2021	PAY-BACK YEAR	DESCRIPTION
Light Rail vehicles oil-less compressors	2019	\$650,100	\$32,034	\$82,937	2039	Compressors on 62 Link Light Rail vehicles were upgraded with oil-less compressors as part of their lifecycle replacement. The new compressors do not use any oil, reduce maintenance costs and improve reliability.
Edmonds Station Parking Lot lighting upgrades	2019	\$7,620	\$1,577	\$4,212	2022	Facilities retrofitted (24) 250 watt metal halide parking lot lights with 100 watt LED lights. The new lights use 60% less energy and require significantly less maintenance.
Angle Lake Garage irrigation controls	2020	\$1,903	\$214	\$375	2029	Installed smart irrigation controls at four locations.
Everett Sounder Station irrigation controls	2020	\$2,562	\$214	\$375	2026	
Issaquah Transit Center irrigation controls	2020	\$2,642	\$1,307	\$1,740	2022	
Mercer Island Park and Ride irrigation controls	2020	\$7,363	\$1,301	\$1,625	2026	
Lynnwood Warehouse lighting upgrades	2020	\$52,606	\$4,489	\$4,489	2028	Replaced interior and exterior linear fluorescent and metal halide lighting with LED.
OMF East solar power	2021	N/A - Installed as part of Design Build project	\$10,159	\$10,159	N/A	100 KW solar array system on the OMF East roof. These solar panels were installed in the original design build contract for the facility.
Union Station Security Operations Center rooftop HVAC unit	2021	\$390,329	\$2,816	\$2,816	2038	Added a dedicated rooftop unit to the security operations center at Union Station, which operates 24/7. This part of Union Station previously served by the main building's HVAC, which can now be placed on a schedule that aligns with the main building occupancy schedule.
Angle Lake Garage irrigation controls phase 2	2021	\$5,160	\$693	\$693	2025	Installed flow sensor and master valve. Upgraded irrigation controller.

PROJECT	PROJECT FINISHED	CAPITAL COSTS	2021 SAVINGS	SAVINGS TO DATE, 2021	PAY-BACK YEAR	DESCRIPTION
Bonney Lake Park and Ride irrigation controls	2021	\$5,926	\$360	\$360	2031	Upgraded master valves, flow sensors and controllers at four locations.
Kent Garage irrigation controls	2021	\$4,346	\$144	\$144	2031	
Union Station irrigation controls	2021	\$3,006	\$202	\$202	2026	
Central OMF irrigation controls	2021	\$11,000	\$549	\$549	2026	

* Cost savings figures for projects implemented through an Energy Performance Contract (denoted with an *) represent average, annualized savings based on the project's projected lifetime savings. These projects may ultimately achieve energy and cost savings in excess of the guaranteed amount.

Appendix C – 2021 Key Performance Indicators

The table below presents the Key Performance Indicators (KPIs), as defined in the 2019 Sustainability Plan. The table also shows the KPIs in relation to their associated Priorities, Long-term goals and Short-term goals, per the Sustainability Plan. The KPIs reflect current progress compared to the 2019 Sustainability Plan's baseline year of 2018. Note that the KPIs below are a subset of the 2019 Sustainability Plan's metrics.

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORMANCE INDICATOR	2018 BASELINE VALUE	2021 VALUE AND/OR PERCENT CHANGE
People	Social equity addressed and implemented as an agency value	Contribute to a revolving loan fund for affordable housing revolving loan fund	# of dollars contributed to affordable housing revolving loan fund	Contributions began in 2019	\$4 million
		Build staff awareness and capacity to integrate equity into all business lines	% of staff trained in equity and inclusion	37% of staff trained	• 88% of staff completed Equal Employment Opportunity Training • 59% of staff completed Implicit Bias Training • 20% of staff completed Inclusion Training • 10% of staff attended Organizational Equity Workshop
		Meet or exceed workforce diversity goals for construction contractors Goals: • 21% people of color • 12% women • 20% apprentices	% of hours worked by diverse communities on ST job sites	• 29% by people of color • 7% by women • 20% by apprentices	• 35% by people of color • 7% by women • 20% by apprentices
	All staff champion sustainability	Certify key staff to green design and building management professional accreditations	# of staff trained to sustainable professional accreditations	• 22 new Envision Sustainability Professionals • 17 new LEED Accredited Professionals • 5 other new sustainability certifications	• 49 Envision Sustainability Professionals • 18 LEED Accredited Professionals • 12 other new sustainability certifications

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORMANCE INDICATOR	2018 BASELINE VALUE	2021 VALUE AND/OR PERCENT CHANGE
Planet	Achieve carbon free operations	Reduce greenhouse gas emissions by 10 percent	% change in greenhouse gas emissions	66,206 tonnes of CO ₂ e	48,513 tonnes of CO ₂ e; 27% reduction since 2018*
			% change in criteria air pollutants	• Particulate Matter: 11,078 lbs • Volatile Organic Compounds: 15,485 lbs • NO_x: 399,828 lbs • CO: 193,411 lbs • SO_x: 9,986 lbs	• Particulate Matter: 9,277 lbs; 16% decrease since 2018* • Volatile Organic Compounds: 14,976 lbs; 3% increase since 2018* • NO_x: 392,124 lbs; 2% decrease since 2018* • CO: 192,800 lbs; 0% decrease since 2018* • SO_x: 8,734 lbs; 13% decrease since 2018*
		Increase production from solar panels to 750 KW	# of kW of renewable energy production	• 76,257 kWh produced • 2.1 KW installed	153,511 kWh produced
		Purchase available cost-effective, carbon-free electricity	% change in renewable electricity procurement	84% electricity from clean and renewable sources	93% electricity from clean and renewable sources in 2021; 11% increase since 2018
	Enhance ecosystem functions	Decrease total energy use 5 percent for all facilities built before 2018	% of facility energy reduced	26,996,437 KBtu	26,935,295 KBtu; 0% reduction since 2018*
		Achieve 100 percent environmental compliance (zero fineable violations)	# of fineable environmental compliance violations	Four	Zero
		Reduce total water use by 10 percent at all existing facilities and sites established before 2018	% change in agency water use	27,521 CCF used	39,870 CCF used; 45% increase since 2018

PRIORITY	LONG-TERM GOALS	APPLICABLE SHORT-TERM GOALS	KEY PERFORMANCE INDICATOR	2018 BASELINE VALUE	2021 VALUE AND/OR PERCENT CHANGE
Prosperity	Build resilience to climate change and natural or manmade disasters	Develop staff awareness of individual roles in emergency prepared	% of staff trained in emergency preparedness	Training began in 2019	• 1,411 staff trained in COVID-19 Work Site Safety • 25 staff attended Safety Lunch and Learns • 449 staff trained in Non-Revenue Vehicle Safe Driving • 17 staff certified in First Aid/CPR/AED
		Conduct a Climate Vulnerability Assessment as part of each major system capital expansion project	% of projects that include Climate Change Vulnerability Assessments	Assessments began in 2019	100% of eligible projects
	Maximize operational efficiency	Divert 50 percent of office waste to recycling or compost	% of waste diverted	35%	33%*
		Include green methods or features in at least 75 percent of all new agency procurements	% increase in # of and dollar value of procurements	• 15% of new procurements • \$299M in value	• 65 procurements - 44% overall and a 193% increase since 2018 • \$389M in value – 30% increase since 2018

* Key Performance Indicator was significantly impacted by reduced ridership, reduced resource use, and/or employee's working remotely due to the COVID-19 pandemic.